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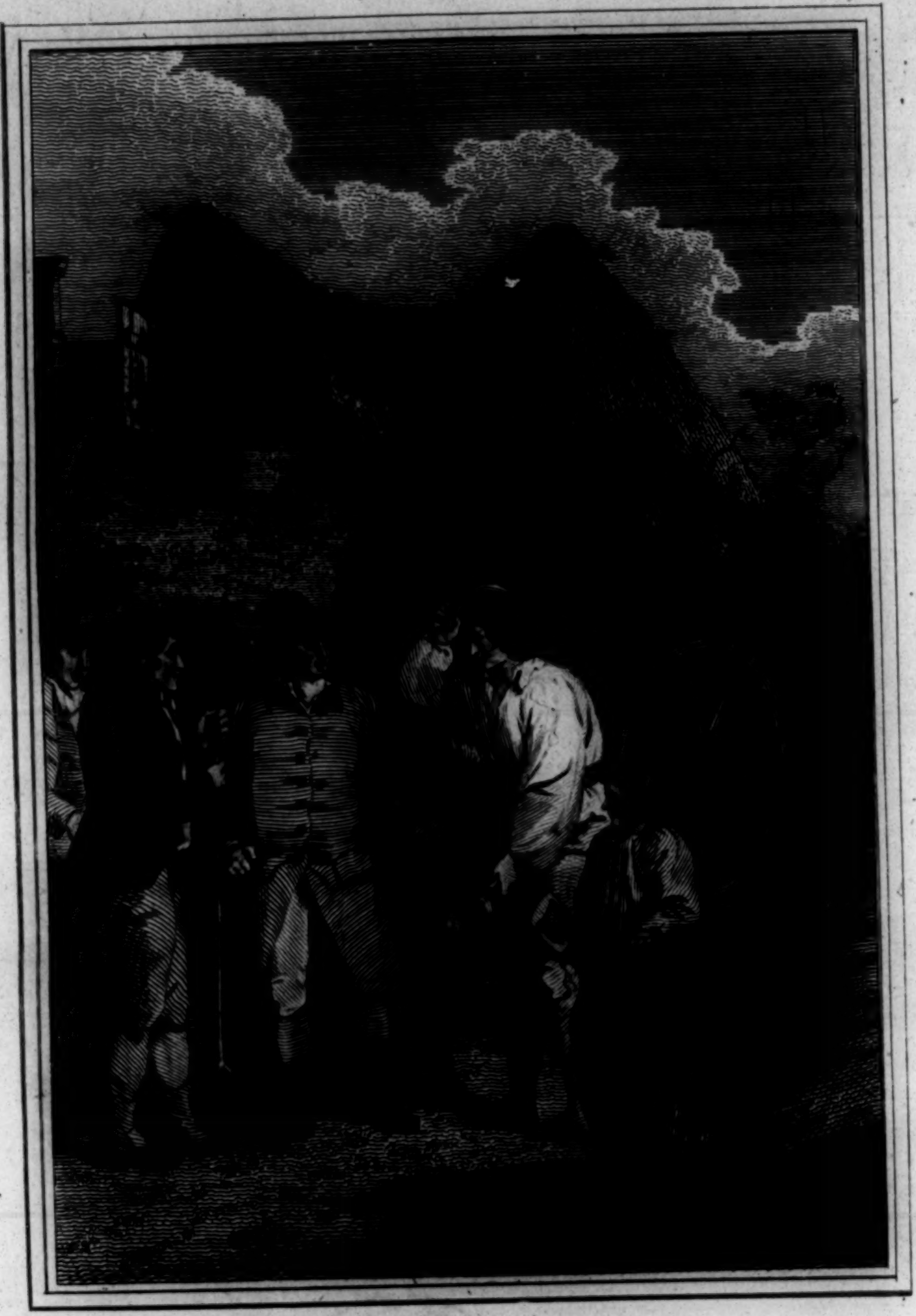

A FARM-YARD.

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THE

COMPLETE FARMER:

OR, A GENERAL

DICTIONARY OF HUSBANDRY

IN ALL ITS BRANCHES;

CONTAINING THE VARIOUS

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ACCORDING TO THE PRECEPTS OF BOTH THE

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The FOURTH EDITION, conſiderably IMPROVED, and greatly ENLARGED.

By A SOCIETY of GENTLEMEN,

MEMBERS OF THE SOCIETY FOR THE ENCOURAGEMENT OF ARTS, MANUFACTURES, AND COMMERCE.

LONDON,

PRINTED FOR T. LONGMAN, B. LAW, G. G. J. AND J. ROBINSON, T. CADELL, R. BALDWIN, W. OTRIDGE,
AND W. LOWNDES.

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ADVERTISEMENT.

HUSBANDRY is, with great juſtice, placed at the head of human arts, as having a very great advantage over all others, both with regard to antiquity and uſefulneſs. It had its birth with the world, and has always been the genuine ſource of ſolid wealth, and real treaſures; for it will furniſh a people with every thing neceſſary to render life happy and deſirable, form the principal revenues of the ſtate, and even ſupply the defect of all others, when they happen.

It is therefore no wonder that the wiſeſt princes, and the moſt able miniſters, among the ancients, made it their principal ſtudy to encourage and improve the Art of Huſbandry; they well knew that the ſtrength of a ſtate ſhould not be eſtimated by the extent of its territories, but by the number of its inhabitants, and the utility of their labours. And it ſhould be remembered, that ſome of the moſt noble conſuls and dictators among the ancient Romans were taken from the Plough, and that the ſenators of that flouriſhing people ſpent the greater part of their time in the country, where they tilled their fields with their own hands. " In thoſe happy times, ſays Pliny, the earth, pleaſed at ſeeing herſelf cultivated by the hands of triumphant victors, ſeemed to make ſtronger efforts, and to produce her fruit in greater abundance." Doubtleſs becauſe they applied themſelves to the taſk with greater attention, and took the wiſeſt precautions to render their labours ſucceſsful: for when men of genius and abilities apply themſelves to any art, they ſoon make great improvements, and advance it to a much higher degree of perfection: while the common people, by ſervilely confining themſelves to the common mode of practice, ſeldom make any farther progreſs in their profeſſion.

But when deſtructive luxury was introduced among the old Romans, Huſbandry declined, and has never ſince reached the honourable ſtation it before poſſeſſed: owing in a great meaſure, to an opinion founded on falſehood, namely, that the practice of Huſbandry requires neither ſtudy, reflection, nor precepts; and is therefore beneath the notice of men of fortune and genius. The ancients, however, thought very differently: they were perſuaded, that, in order to cultivate lands to advantage, it was neceſſary to ſtudy the works of thoſe who had written on this ſubject, and to add the experience of others to their own. This opinion is now happily eſtabliſhed; and the Study of Huſbandry purſued with ſuch aſſiduity in different parts of Europe, by perſons of rank and fortune, that an amazing number of the moſt important diſcoveries have been lately made in that uſeful and neceſſary branch of knowledge.

But theſe uſeful Diſcoveries and Improvements are ſcattered through a multitude of volumes, written in different languages, and publiſhed in different countries; ſo that they can only be known to thoſe who have abilities to purchaſe, and leiſure ſufficient to peruſe ſo great a variety of books.

The authors of this undertaking were therefore perſuaded, that a Work, containing the Precepts relating to the Theory and Practice of every Branch of Huſbandry, delivered in the plaineſt and moſt intelligent manner, and enriched with the Diſcoveries hitherto made in any part of Europe, would greatly tend to promote the Intereſt of their country. Filled with this pleaſing Idea, they chearfully undertook the laborious taſk; and have accordingly collected in this Dictionary all the valuable Precepts, Obſervations, Diſcoveries, and Improvements, contained in the writings of *Linnæus*, *Barck*, *Tarello*, *Duhamel*, *Chateauvieux*, *De Liſle*, the Marquis of *Turbilly*, *Fitz-Herbert*, *Hartlib*, *Platt*, *Evelyn*, *Houghton*, *Worlidge*, *Stillingfleet*, *Mortimer*, *Tull*, *Ellis*, *Miller*, *Hale*, *Liſle*, *Roque*, *Mills*, *Young*, *Marſhall*, and ſeveral other Authors; together with thoſe publiſhed by the Societies of *Berne*, *Lions*, *Tours*, *Paris*, *Rouen*, *Dublin*, *Edinburgh*, *London*, *&c. &c.*

And they hope that this Attempt to give a COMPLETE SYSTEM of every branch of Huſbandry, and to blend in One Work the various Diſcoveries made in different Nations, deſerves the moſt ſerious Encouragement. They alſo hope that the pains they have taken to inſert every thing belonging to the ſame ſubject in one article, and to range the whole in alphabetical order, will be approved of by the Public, as it evidently tends to facilitate the Study of Huſbandry, by enabling the Reader to find, with the greateſt eaſe and expedition, whatever ſubject he may be deſirous of conſidering.

The great number of COPPER-PLATES with which this work is illuſtrated, muſt alſo prove a very valuable addition, and render it far ſuperior to any ſingle Treatiſe of this kind ever yet offered to the world; as it is impoſſible to convey an adequate idea of the various inſtruments, lately invented or improved, for facilitating the practice of Huſbandry, without the aſſiſtance of accurate drawings. This has, however, rendered the work far more expenſive: but being determined to make it as complete as poſſible, they have ſpared nothing in their power to ſucceed; as the great ſucceſs works of this kind have met with from the generous Public, and of which they hope to partake, in proportion to the merit of the production.

A
GENERAL DICTIONARY
OF
HUSBANDRY.

ABELE-TREE, a ſpecies of poplar, growing naturally in all the temperate parts of Europe, and called by botaniſts *populus foliis lobatis dentatis ſubus tomentoſis*.

The leaves of the abele-tree are large, and divided into three, four, or five lobes, which are indented on their edges, of a very dark colour on their upper ſide, but very white and downy on their under, ſtanding upon foot-ſtalks about an inch long. The young branches have a purple bark, and are covered with a white down; but the bark of the ſtem and older branch is grey. In the beginning of April, the male flowers or catkins appear, which are cylindrical, ſcaly, and about three inches long; about a week after come out the female flowers, or catkins, which have no ſtamina like thoſe of the male. Soon after theſe come out, the male catkins fall off, and in five or ſix weeks after, the female flowers will have ripe ſeeds incloſed in a hairy covering; then the catkins will drop, and the ſeeds will be wafted by the winds a great diſtance. This tree is often confounded with the white poplar; but they are in reality diſtinct ſpecies.

The abele-tree may be propagated either by layers or cuttings, which will readily take root, or by ſuckers, which they ſend up from their roots in great plenty. The beſt time for tranſplanting theſe ſuckers is in October, when their leaves begin to decay. Theſe may be placed in a nurſery for two or three years to get ſtrength before they are planted out where they are deſigned to remain; but if they are propagated from cuttings, it is better to defer the work till February, at which time truncheons of two or three feet long ſhould be thruſt about a foot and a half into the ground. Theſe will readily take root, and, if the ſoil, in which they are planted, be moiſt, will arrive to a conſiderable bulk in a few years.

A conſiderable advantage may be made by planting theſe trees upon boggy ſoils, where few other trees will thrive. Many ſuch places there are in England, which do not at preſent bring in much money to their owners; whereas, if they were planted with theſe trees, they would in a very few years, be of more value than the ground, clear of all expences; but there are many perſons, who think nothing, except corn, worth cultivating in England; or, if they plant timber, it muſt be oak, aſh, or elm; and if their land be not proper for either of theſe, it is conſidered as of little value: whereas, if the nature of the ſoil was examined, and proper ſorts of plants adapted to it, there might be very great advantages made of ſeveral large tracts of land, which at this time lie neglected.

The wood of the abele-tree is very good for floors, where it will laſt many years, and for its exceeding whiteneſs is, by many perſons, preferred to oak; but being of a ſoft nature, is very ſubject to take the impreſſions of nails, &c. which renders it leſs proper for this purpoſe. It is alſo very good for wainſcoting rooms, being leſs ſubject to ſwell or ſhrink than moſt other woods; but for turnery-ware there is no wood equal to this for its exceeding whiteneſs. So that trays, bowls, and many other utenſils are made of it; the bellows-makers alſo prefer it for their uſe, as do alſo the ſhoe-makers for heels of ſhoes; it is likewiſe very good to make light carts, and the poles are very proper to ſupport hops, vines, &c. and the lopping will afford good fuel, which in many countries is much wanted. *Miller's Dict.*

The abele-tree is very proper for planting where you deſire a ſpeedy ſhelter and walks, it often making ſhoots of eighteen or twenty feet long in a year. *Mortimer's Huſbandry.*

ABLAQUEATION, the removing the earth, and laying bare the roots of fruit trees in winter, that they may be the more readily expoſed to the influence of rains, ſnow, air, &c. an operation formerly thought neceſſary for their future welfare; but experience has ſhewn it to be a dangerous practice, eſpecially where the trees are much expoſed to the winds, particularly the ſouth-weſt, which are generally the moſt violent. The practice of ablaqueation is therefore with very good reaſon laid aſide in the preſent practice.

ABORTIVE CORN, a diſtemper of corn mentioned by Mr. Tillet, in a Diſſertation which gained the prize at the academy of Bourdeaux.

This diſtemper, ſays that ingenious naturaliſt, ſhews itſelf long before harveſt, when the ſtalk is not above eighteen inches high; and may be known by a deformity of the ſtalk, the leaves, the ear, and even the grain.

The ſtem of abortive corn is generally ſhorter than that of other plants of the ſame age; it is crooked, knotted, and ricketty; the leaves are commonly of a bluiſh green colour, curled up in various forms; ſometimes turned like wafer cakes, and often rolled in a ſpiral form. The ears have very little of their natural form; they are lean, withered, and ſhew very imperfect rudiments, either of the chaff or grain.

All theſe ſymptoms are however only to be found in plants that are in the height of the diſtemper. The ſtalks are often pretty ſtrait, the leaves but little curled, and the chaff tolerably well formed; but inſtead of encloſing a ſmall embryo, white and ſoft at the ſummit, it contains only a green kernel terminating in a point, not unlike a young pea when forming in its pod.

Theſe abortive kernels have two or three points very viſible; they are then faſhioned as if two or three kernels were joined together at the baſe. When theſe kernels are ripe, or rather when they are dried up, they grow black, and ſo greatly reſemble the ſeeds of cockle, that huſbandmen, who are not acquainted with this diſtemper, often confound abortive wheat with the ſeeds of that weed.

This diſtemper Mr. Tillet ſuſpects to be occaſioned by inſects; for he perceived on the ſickly plants ſmall drops of a very limpid liquor, which he judged to be extravaſated ſap.

ACORNS, the fruit of the oak, and too well known to need any deſcription. See OAK.

Acorns are ſaid to have been the primitive food of mankind; but at preſent they are principally uſed in fattening hogs, for which they are very proper.

Mr. Marſhall, in his Rural Economy of Gloceſterſhire, ſays, that acorns in the vale of Berkeley are in high eſteem. The farmers there ſeem to be as anxious about their acorns as their apples. They conſider them as the beſt of fatting. They think the acorns make the bacon firm, and cauſe it to weigh better than bean-fed bacon. How various are opinions in different countries! The price of acorns there is 1*s.* and 6*d.* to 2*s.* per buſhel, according to the ſeaſon; and according to the price of beans. But few are ſold. Every farmer collects his own, or tends his pigs upon them. Acorns in the year 1783 were unuſually plenty, when ſeveral trees had branches broken down with them; and many bent down like apple or pear trees under their load.

Some care is, however, neceſſary to be taken when hogs are feed upon acorns, for otherwiſe they will be ſubject to a diſtemper called the garget. To prevent which, the beſt way is to moiſten ſome peaſe or beans with water, and ſprinkle over it ſome antimony pounded and ſifted; if this be repeated every other day for a fortnight or three weeks, it will effectually preſerve them from the diſorder. Or if the acorns be collected and prepared in the following manner, they may be given to hogs without any danger.

Dig a hole in the ground in a warm place, large enough to contain ſeveral buſhels of acorns; in this let the acorns be put, and well moiſtened with water, in which a handful or two of common ſalt has been diſſolved: in a few days they will begin to heat and ſpire: obſerve them therefore attentively, and when they have made a ſhoot about three inches long, take them out of the hole, and ſpread them to dry on a barn floor, and in a day or two they will be fit to be given to the hogs. This matter muſt, however, be managed with care and caution; they muſt not have too many given at a time; at firſt twice a day is often enough to feed them for a day or two; afterwards three times a day. Nor ſhould they, while they eat this food, be confined to a ſtye, but ſuffered to run at large; for if their liberty be too much abridged, they will never thrive well, or grow fat on acorns.

It is no uncommon thing in Hertfordſhire, with the management above directed, and the aſſiſtance of a little waſh, and a few grains now and then, for a farmer to kill ſeveral hogs in a ſeaſon, which ſhall weigh from eight to ten ſcore, and ſometimes even more.

Theſe hogs make very good meat, but it is not ſo fine as when the hogs are taken up, and four or five buſhels of peaſe or barley meal given to each, to complete their fattening before they are killed. *Muſeum Ruſticum, Vol.* I. *p.* 475.

The method of planting acorns by ſome is to raiſe plants by making a hole to receive the acorn in an oblique direction, ſo as to raiſe up a tongue of turf, under which the acorn is to be depoſited, where it will require no kind of nurſing. In about thirty years the ſpat will be fit to be coppiced, that is, partially cut down as underwood, leaving the moſt healthy plants. The weeding may be ſold for railing, and will fetch a good price. Mr. Marſhal ſays that a piece of ground ſomewhat more than four acres, in Warwickſhire, planted about 1730, has already paid its owner upwards of 400*l.* and the timber, is ſtill too thick; ſome of them are worth twenty to twenty-five ſhillings a tree, from 40 to 50 feet high, and from 6 to 10 inches timber girth. The ſoil is an hungry clay, worth about 7*s.* or 8*s.* an acre; the clay continuing a conſiderable depth.

Acorns might be dibbled in by women. Indeed they are frequently ſcattered over ſome grounds, two or three within a ſquare yard, by ſome unaccountable manner if not by rooks or wood-pigeons, and trodden into the ground by cattle. They may be ſown broad caſt, when the ſurface is moiſt, and rolled in with a light roller. On examination, after the plants appear, the acorns remain as perfect as they could be the day they were dropt, notwithſtanding ſome of the ſeedling plants may be ſix inches high, and their roots not leſs than a foot long. From the manner in which the acorns adhere to the plant, which is by two tough ligaments growing out of the two lobes of the acorn, the roots appear to have ſtruck firſt, and the ſtem to have afterwards ſhot up from it. They may be ſown about the middle of November, ſet out by a land chain, a quarter of a rod aſunder, and ſix inches apart in the rows; dibbling them in zigzag, alternately on either ſide, a line ſtretched tightly on the ſurface, with blunt-pointed dibbles, letting a little mould fall down to the bottoms of the holes, to prevent water lodging round the acorns, burying them about two inches beneath the ſurface. Each ſquare rod planted this way takes 132 acorns, nearly the contents of a pint when they are middle ſized. A pint a rod is equal to two ſtatute buſhels and half on an acre. The expence of planting acorns in this way is about 5*s.* an acre.

ACRE, a ſuperficial meaſure of land, containing, according to the ſtatute, one hundred and ſixty ſquare poles or perches, of ſixteen feet and a half long.

But this meaſure does not prevail in all parts of England; for though one hundred and ſixty ſquare poles or perches, are allowed to be an acre, yet the length of the pole varies in different counties, and is generally called cuſtomary meaſure.

Thus the cuſtomary perch in Staffordſhire is twenty-four feet. In the foreſt of Sherwood twenty-one. In Herefordſhire the perch of walling is ſixteen feet and a half; but a perch for digging twenty-one feet.

Old farmers alſo eſtimate the acre of land by the proportion of ſeed uſed in ſowing it; by which means it muſt vary in proportion to the fertility or barrenneſs of the ſoil; and hence in many counties of England they have two ſorts of acres, diſtinguiſhed by ſeed acres and ſtatute acres.

The French acre, or arpent, according to Mr. Greaves's calculation, conſiſts of 100 perches of twenty-two feet each, amounting to 48,400 ſquare French feet, which are equal to 51,691 ſquare Engliſh feet, or very near one acre, and three quarters of a rood, Engliſh meaſure.

The Iriſh acre is to the Engliſh, as 196 to 121. For the number of poles in each are the ſame; but the Iriſh pole is twenty-one feet, whereas the Engliſh contains only ſixteen feet and a half: and the Welch acre is equal to two Engliſh ſtatute-acres.

ACREME, a quantity of land conſiſting of ten acres.

ADDER'S-TONGUE, a weed growing in low moiſt meadows, where it is commonly hid among the graſs.

From a very low ſtalk ariſes a ſingle, thick, ſmooth oblong leaf, from the bottom of which iſſues a kind of tongue, ending in a point, and indented on each ſide like a file.

ADDER-STUNG, is ſaid of cattle when ſtung by adders, or bit by a hedge-hog; to remedy which uſe an ointment made of dragon's blood with a little barley meal and the white of an egg.

AFTERMATH, the ſecond crop, or graſs which ſprings up after mowing, or the graſs cut after the corn.

In the neighbourhood of London, the aftermath when made into hay, is of conſiderable value: but in haying this crop, ſo as to make it ſell well, great nicety is requiſite; the nature of the aftermath-graſs being more ſoft, ſpungy, and porous, than the firſt growth, and therefore more liable to be hurt by rains. See HAY.

Mr. Marſhal, in his Rural Economy of the Midland Counties, commends their management of aftergraſs, as in general judicious. It is generally ſuffered to get up to a full bite before it be broken: not turned in upon, as ſoon as the hay is off, nor ſuffered to ſtand until much of it be waſted.

If we examine the remaining herbage of ground recently mown, we find it conſiſt, either of the ſtubs and root-leaves of plants which have run up to feed, or of weak underling plants which have not been able to cope with their more powerful neighbours, or of late flowering plants.

The quality of the firſt is, of courſe, injured by age, and by the ſtrength of the root having been ſpent on the upper leaves, fructifications, and ſeeds. That of the ſecond cannot be good: they are in a ſimilar predicament to graſs growing under a hedge, or in a wood, checked in their growth, and ſhaded from the ſun. And the laſt partakes, in ſome degree, of the ſame diſadvantages; though, of the three claſſes, they probably contain the moſt nouriſhment.

Two of the ableſt rural œconomiſts of theſe kingdoms, (one in Lancaſhire, the other in Leiceſterſhire) make a point of ſaving autumnal graſs for ſpring-feed; and they aſſert that it is the moſt certain, and on the whole the beſt ſpring-feed at preſent known. The forwardeſt ought to be broken ſufficiently early to be eaten, without waſte, before winter ſet in; and the lateſt, that is to ſay, the ſhorteſt, ſhould be ſhut up for ſpring-feed. If aftergraſs be too long and groſſy it is apt to lodge, and rot upon the ground in winter; therefore on rich land it ought to be more or leſs fed before Michaelmas; and then, of a due length, be ſhut up for the winter.

Mr. Young, in his Annals of Agriculture, ſays, that he found, from repeated experiments, that this old graſs feeds the ſheep, that give milk, better than turnips, which are more adapted to dry or fatten ſtock. He further ſays, that this graſs holds to a period, if wanted when moſt other reſources fail, the laſt half of April, and the firſt half of May; periods always of want and difficulty, where rye graſs is not ſworn. Mr. Marſhal ſays, that as a certain and wholeſome ſupply of food for ewes and lambs in early ſpring, this preſerved paſture is depended upon as the ſheet-anchor; in preference to turnips, cabbages, or any other ſpecies whatever of what is termed ſpring-ſeed.

AGE *of a horſe.* This is eaſily known by his mouth, till he comes eight, after which the uſual marks wear out. A horſe, like many other brute animals, has his teeth divided into three ranks, viz. his fore-teeth, which are flat and ſmooth, his tuſhes, and his back-teeth. His back-teeth, or jaw-teeth, are called his grinders, being thoſe by which a horſe chews and grinds his provender, and are twenty-four in number, twelve above, and twelve below: they are ſtrong double teeth with ſharp edges; but when a horſe grows old they wear much ſmoother.

The firſt that grows are his foal teeth, which begin to appear a few months after he is foaled: they are twelve in number, ſix above, and ſix below; and are eaſily diſtinguiſhed from the teeth that come afterwards, by their ſmallneſs and whiteneſs, not unlike the foreteeth of a man.

When the colt is about two years and a half old, he caſts the four middlemoſt of his foal-teeth, viz. two above and two below; but ſome do not caſt any of their foal teeth, till they are near three years old. The new teeth are eaſily diſtinguiſhed from the foal teeth, being much ſtronger, and always twice their ſize, and are called the nippers or gatherers, being thoſe by which a horſe nips off the graſs, when he is feeding abroad in the fields, or, in the houſe, gathers his hay from the rack. When a horſe has got theſe four teeth complete, he is reckoned three years old.

When he is about three and a half, or in the ſpring before he is four years old, he caſts out four more of his foal teeth, viz. two above, and two below, one on each ſide the nippers, or middle teeth: ſo that when you look into a horſe's mouth, and ſee the two middle teeth full grown, and none of the foal teeth, except the common teeth remaining, you may conclude he is four that year, about April or May. Some indeed are later colts, but that makes little alteration in the mouth.

The tuſhes appear near the ſame time with the four laſt mentioned teeth, ſometimes ſooner than theſe, and ſometimes not till after a horſe is full four years old: they are curved like the tuſhes of other beaſts, only in a young horſe they have a ſharp edge all round the top, and on both ſides, the inſide being ſomewhat grooved and flattiſh, inclined to a hollowneſs.

When a horſe's tuſhes do not appear for ſome time after the foal teeth are caſt out, and the new ones come in their room, it is generally owing to their foal teeth having been pulled out before their time, by the breeders or other dealers in horſes, to make a colt of three years old appear like one of four, that he may be the more ſaleable; for when any of the foal teeth have been pulled out, the others ſoon come in their places; but the tuſhes having none that go before them can never make their appearance till their proper time, viz. when a horſe is about four, or coming four; and therefore one of the ſureſt marks to know a four year old horſe, is by his tuſhes, which are then very ſmall, and ſharp on the top and edges.

When a horſe comes five, or rather in the ſpring before he is five, the corner teeth begin to appear, and at firſt but juſt equal with the gums, being filled with fleſh in the middle. The tuſhes are alſo by this time grown to a more diſtinct ſize, though not very large: they likewiſe continue rough and ſharp on the top and edges. But the corner teeth are now moſt to be remarked; they differ from the middle teeth in being more fleſhy on the inſide, and the gums generally look rawiſh upon their firſt ſhooting out, whereas the others do not appear diſcoloured. The middle teeth arrive at their full growth in leſs than three weeks, but the corner teeth grow leiſurely, and are ſeldom much above the gums till a horſe is full five: they differ alſo from the other fore-teeth in this, that they ſomewhat reſemble a ſhell; and thence are called the ſhell teeth, becauſe they environ the fleſh in the middle half way round; and as they grow, the fleſh within diſappears, leaving a diſtinct hollowneſs and openneſs on the inſide. When a horſe is full five, theſe teeth are generally about the thickneſs of a crown piece above the gums. From five to five and a half they will grow about a quarter of an inch high, or more; and when a horſe is full ſix, they will be near half an inch, and in ſome large horſes a full half inch above the gums.

The corner teeth in the upper jaw fall out before thoſe in the under, ſo that the upper corner teeth are ſeen before thoſe below; on the contrary the tuſhes in the under gums come out before thoſe in the upper.

When a horſe is full ſix years old, the hollowneſs on the inſide begins viſibly to fill up and that which was at firſt fleſhy grows into a browniſh ſpot, not unlike the eye of a dried garden bean, and continues ſo till he is ſeven; with this difference only, that the tooth is more filled up, and the mark, or ſpot, becomes faint, and of a lighter colour. At eight the mark in moſt horſes is quite worn out, though ſome retain the veſtiges of it a long time; and thoſe who have not had a good deal of experience, may ſometimes be deceived by taking a horſe of nine or ten years old for one of eight. It is at this time only, when a horſe is paſt mark, that one can eaſily err in knowing the age of a horſe; for what practices are uſed to make a very young horſe or colt appear older than he is, by pulling out the foal teeth before their time may be diſcovered by feeling along the edges where the tuſhes grow, for they may be felt in the gums before the corner teeth are put forth; whereas, if the corner teeth come in ſome months before the tuſhes riſe in the gums, we may reaſonably ſuſpect that the foal teeth have been pulled out at three years old.

It will perhaps, be needleſs to mention the tricks that are uſed to make a falſe mark in a horſe's mouth, by hollowing the tooth with a graver, and burning a mark with a ſmall hot iron; becauſe thoſe who are acquainted with the true marks, will eaſily diſcover the cheat by the ſize and colour of the teeth, by the roundneſs and bluntneſs of the tuſhes, by the colour of the falſe mark, which is generally blacker, and more impreſſed than the true mark, and by many other viſible tokens, which denote the advanced age of a horſe.

After the horſe has paſſed his eighth year, and ſometimes at ſeven, nothing certain can be known by the mouth. It muſt, however, be remembered, that ſome horſes have but indifferent mouths when they are young, and ſoon loſe their mark; others have their mouths good for a long time, their teeth being white, even, and regular, till they are ſixteen years old and upwards, together with many other marks of freſhneſs and vigour; but when a horſe comes to be very old, it may be diſcovered by ſeveral indications, the conſtant attendants of age, viz. his gums wear away inſenſibly, leaving his teeth long and naked at their roots: the teeth alſo grow yellow, and ſometimes browniſh. The bars of the mouth, which in a young horſe are always fleſhy, and form ſo many diſtinct ridges, are, in an old horſe, lean, dry, and ſmooth, with little or no riſing. The eye-pits in a young horſe (except thoſe come of old ſtallions) are generally filled up with fleſh, look plump and ſmooth; whereas in an old horſe, they are ſunk and hollow, and make him look ghaſtly, and with a melancholy aſpect. There are alſo other marks which diſcover a horſe to be very old, viz. grey horſes turn white, and many of them all over flea-bitten, except their joints. This, however, happens ſometimes later, and ſometimes ſooner, according to the variety of colour and conſtitution. Black horſes are apt to grow grey over their eye-brows, and very often over a good part of their face, eſpecially thoſe who have a ſtar or blaze fringed round with grey when they are young. All horſes, when very old, ſink more or leſs in their backs, and ſome horſes, that are naturally long backed, grow ſo hollow with age, that it is ſcarce poſſible to fit them with a ſaddle. Of this kind are ſeveral Spaniſh and Barbary horſes, and many of the Daniſh and Flanders breed. Their joints alſo grow ſtiff with old age, and their knees and hocks bend ſo, that they are apt to trip and ſtumble upon the leaſt deſcent, though the way be ſmooth, and no ways rugged. After which they can be of little uſe to the owner. *Gibſon on Horſes.*

AGE *of neat cattle,* viz. *the ox, cow, and bull.* The age of theſe animals is known by the teeth and horns. At the end of ten months they ſhed their firſt fore-teeth, which are replaced by others, larger, but not ſo white; and in three years all the inciſive teeth are renewed. Theſe teeth are at firſt equal, long, and pretty white; but as the creatures advance in years, they wear, become unequal, and black.

They alſo ſhed their horns at the end of three years; and theſe alſo are replaced by other horns, which, like the ſecond teeth, continue. The manner of the growth of theſe horns is not uniform, nor the ſhooting of them equal. The firſt year, that is the fourth year of the creature's age, two ſmall pointed horns make their appearance, neatly formed, ſmooth, and towards the head terminated by a kind of button. The following year this button moves from the head, being impelled by a horney cylinder, which lengthening in the ſame manner, is alſo terminated by another button, and ſo on: for the horns continue growing as long as the creature lives. Theſe buttons become annular joints, which are eaſily diſtinguiſhed in the horn, and by which the age of the creature may be eaſily known; counting three years for the point of the horn, and one for each of the joints. *Buffon's Hiſtoire Naturelle, tom.* IV.

AGE *of ſheep.* Theſe animals in their ſecond year have two broad teeth; in their third year they have four broad teeth before; in their fourth year ſix broad teeth, and in their fifth year eight broad teeth. After which none can tell how old a ſheep is while their teeth remain, except by being worn down. *Ellis on Sheep.*

At the end of one year, rams, ſheep, and weathers, loſe the two fore-teeth of the lower jaw; and they are known to want the inciſive teeth in the upper-jaw. At eighteen months the two teeth joining to the former, alſo fall out; and at three years, being all replaced, they are even and pretty white. But as the creature advances in age, they become looſe, blunt, and afterwards black. The age of the ram, and all horned ſheep, may alſo be known by their horns, which ſhew themſelves in their very firſt year, and often at the birth, and continue to grow a ring annually to the laſt period of the creature's life. *Buffon's Hiſtoire Naturelle, tom.* V.

AGE *of goats.* The age of goats is known by the ſame tokens as thoſe of the ſheep, *viz.* by their teeth, and the annular rings on their horns.

AGRICULTURE, the art of tilling, manuring, and cultivating the earth, in order to render it fertile.

This art claims the precedency of all others in point of antiquity, it having been the ſole employment of our firſt parents in the delightful garden of Eden.

Adam inſtructed his children in this neceſſary art, both by precept and example; and we are told by the ſacred hiſtorian, that Cain applied himſelf to huſbandry, while Abel led the life of a ſhepherd, and contented himſelf with feeding his flocks.

After the deluge the deſcendants of Noah carried with them the art of huſbandry, and eſtabliſhed it in the various countries where they ſettled. It was, however, very ſimple in theſe early ages, and its advances towards perfection ſlow and almoſt imperceptible.

Abraham and the reſt of the patriarchs, who had no fixed reſidence, applied themſelves to a paſtoral life, enobling, by their example, a profeſſion, which has now for many ages loſt its original dignity, from its being practiſed only by the meaner ſort of people. But as ſoon as their deſcendants were fixed in Paleſtine, they all became huſbandmen, from the chief of the tribe of Judah, to the loweſt branch of the family of Benjamin: birth at that time made no diſtinction, and agriculture was conſidered as a very honourable employment.

The Chaldeans, who inhabited the countries where agriculture had its birth, carried that valuable art to a conſiderable degree of perfection; they cultivated their lands with great aſſiduity, and enjoyed the pleaſing ſatisfaction of receiving from their fields a very plentiful harveſt. The Egyptians, who from the fertility of their country, cauſed by the annual overflowings of the Nile, raiſed prodigious quantities of corn, were ſo ſenſible of the bleſſings reſulting from agriculture, that they aſcribed the invention of it to Oſiris; and even carried their ſuperſtitious gratitude ſo far, as to worſhip thoſe animals that laboured in tilling the ground.

The Phœnicians, ſo well known in the ſacred writings by the name of Philiſtines, were alſo famous for their ſkill in agriculture; but finding themſelves too much confined in their native country by the conqueſts of the Iſrealites, they ſpread themſelves through the greater part of the iſlands of the Mediterranean, and carried with them their knowledge in huſbandry.

The Carthaginians followed the taſte of their anceſtors, and applied themſelves aſſiduouſly to the ſtudy of agriculture. Mago, their famous general, wrote no leſs than twenty-eight books on that ſubject, and which Columella tells us were tranſlated into Latin by an expreſs decree of the Roman ſenate. Servius adds, that Virgil uſed theſe books as a model when he wrote his Georgics.

The ancients tells us, that the goddeſs Ceres was born in Sicily, where ſhe invented the art of ſowing corn, and the tillage of land. The meaning of this fable is very evident; that iſland was very fruitful in corn, and agriculture was there eſteemed ſo honourable an employment, that even their kings did not diſdain to practiſe it with their own hands.

But time, which at firſt gave birth to arts, often cauſed them alſo to be forgotten, when they were removed from the place of their origin. The children of Noah, who ſettled in Europe, doubleſs carried with them the knowledge of agriculture; but their deſcendants, who took poſſeſſion of Greece, were ſuch a ſavage race, that they fed on herbs, after the manner of beaſts. Pelaſgus taught them the culture of the oak, and the uſe of acorns as food, for which divine honours were paid him.

The Athenians, who were the firſt that received any tincture of politeneſs, taught the uſe of corn to the reſt of the Greeks; they alſo taught them the manner of cultivating the ground, and preparing it for ſeed. The Greeks ſoon perceived that bread was more wholeſome, and its taſte more delicate than acorns; and accordingly thanked the gods for ſuch an unexpected and beneficial preſent. After this the Athenian kings thinking it more glorious to govern a ſmall ſtate wiſely, than to aggrandize themſelves by foreign conqueſts, withdrew their ſubjects from war, and employed them ſolely in cultivating the earth. This conſtant application carried agriculture to a conſiderable degree of perfection, and ſoon reduced it into an art.

Heſiod, who is generally thought to have been contemporary with Homer, was the firſt among the Greeks who wrote on this ſubject. He calls his poem "Works and Days;" becauſe agriculture requires exact obſervations of times and ſeaſons.

The other eminent Greek writers upon agriculture, are Democritus of Abdera, Socraticus, Xenophon, Tarentinus, Architas, Ariſtotle, and Theophraſtus, from whom the art received conſiderable improvements; as alſo from Hieron, Epicharmus, Philometer, and Attalus.

The old Romans eſteemed agriculture ſo honourable an employment, that in the earlieſt times of the republic, the higheſt praiſe that could be given a man, was to ſay of him, that he cultivated well his own ſpot of ground. The moſt illuſtrious ſenators applied themſelves to this profeſſion; nor had they either ſplendor or majeſty, but when they appeared in public. And their greateſt generals, at their return from the toils of war, from taking of cities, and ſubduing of nations, were impatient till they were again employed in cultivating their lands, and thought it no diſgrace to follow the plough, though they were at the ſame time prepared to ſerve the wants of the republic, attend her councils, or put themſelves at the head of her armies.

It muſt indeed be allowed, that when the Romans became tainted with the luxury of Aſia, they gradually loſt the noble ſimplicity of their anceſtors, and employed their ſlaves in the ſeverer labours of a country life. But though they did not themſelves hold the plough, yet even men of conſular dignity looked upon it as a reward for their public ſervices, when they obtained leave to retire into the country, and were equally reſpected when overlooking their farms, as when ſeated in the chair of magiſtracy. M. Cato, the Cenſor, that illuſtrious Roman general, orator, politician, and lawyer, after having governed provinces, and ſubdued nations, did not think it below his ſtation to write a large treatiſe on agriculture.

This work, according to Servius, was dedicated to his own ſon, and was the firſt Latin treatiſe on that ſubject. This work, has been handed down to us in all its purity, in the ſame manner as Cato wrote it. Varro compoſed a treatiſe on the ſame ſubject, and on a more regular plan. This work is embelliſhed with all the Greek and Latin erudition of that learned author.—Agriculture alſo received great improvements from the two Saſernaes, and likewiſe from Scorſa, Tremellius, and M. Terentius. Virgil has adorned it with the language of the muſes, and given it majeſty by his verſe. He has finely embelliſhed the precepts of huſbandry left by Heſiod and Mago.

Columella, who flouriſhed in the reign of the emperor

Claudius, wrote twelve books on huſbandry. He was a native of Bœtica in Spain, and had devoted his time to the ſtudy of huſbandry.

From this time till the reign of Conſtantine IV. huſbandry continued in a declining ſtate, when that wiſe emperor cauſed a large collection of the moſt uſeful precepts relating to agriculture to be extracted from the beſt writers, and publiſhed under the title of Geoponics.—Some ſay he made this collection with his own hand. Nor is this at all improbable, as it is well known, that after he had conquered the Saracens and Arabians, he not only practiſed, but ſtudied the arts of peace, fixing his chief attention on the advancement of huſbandry.

But from the time of Conſtantine IV. till about the year 1478, agriculture lay in a kind of dormant ſtate, when Creſcenzio publiſhed an excellent performance on agriculture at Florence. He was ſoon followed by ſeveral of his countrymen, among whom Tatti, Stefano, Auguſtino Gallo, Sanſovino, Lauro, and Tarello, deſerve particular honour.

In the mean time Fitz-Herbert, judge of the Common Pleas, ſhone with unrivalled luſtre in the practical parts of huſbandry. He publiſhed two treatiſes on this ſubject; the firſt, which was entitled, The Book of Huſbandry, appeared in 1534, and the ſecond, called, The Book of Surveying and Improvements, in 1539.

Fitz-Herbert's books of agriculture ſoon raiſed a ſpirit of emulation in his countrymen, and many treatiſes of the ſame kind ſucceſſively appeared; but time has deprived us of many of thoſe writings, or at leaſt they are become ſo very ſcarce, as only to be found in the libraries of the curious.

About the year 1600, France made ſome conſiderable efforts to revive huſbandry, as appears from ſeveral large works, particularly *Les Moyens de devenir Riche*, and the *Coſmopolite*, by Barnard de Paliſſy, a poor potter; *Le Theatre d'Agriculture*, by de Serres; *L'Agriculture & Maiſon Ruſtique*, by Meſſrs. Etienne and Liebault, &c.

The Flemings, about the ſame period, dealt more in the practice of huſbandry, than in publiſhing books on the ſubject; ſo that their attention doubtleſs was to carry on a private lucrative trade, without inſtructing their neighbours: and hence it happened, that whoever was deſirous of copying their method of agriculture, was obliged to travel into their country, and make his own remarks. The principal, and indeed juſt, idea of huſbandry conſiſted in this, namely, to make a farm reſemble a garden as near as poſſible. Such an excellent principle at firſt ſetting out, led them of courſe to undertake the culture of ſmall eſtates only, which they kept free from weeds, continually turning the ground, and manuring it plentifully and judiciouſly.

When they had by this method brought the ſoil to a proper degree of cleanlineſs, health, and ſweetneſs, they ventured chiefly upon the culture of the more delicate graſſes, as the ſureſt means of acquiring wealth in huſbandry upon a ſmall eſtate, without the expence of keeping many draught horſes or ſervants.

A few years experience was abundantly ſufficient to convince them, that ten acres of the beſt vegetables for feeding cattle, properly cultivated, would maintain a larger ſtock of grazing animals, than forty acres of common farm graſs. They alſo found that the beſt vegetables for this purpoſe were lucern, ſaintfoin, trefoil of moſt denominations, ſweet fenugreek, buck and cow-wheat, field turnips, and ſpurrey.

The political ſecret of their huſbandry, therefore, conſiſted in letting farms on improvement. They alſo diſcovered eight or ten new ſorts of manure. They were the firſt among the moderns who ploughed-in living crops for the ſake of fertiliſing the earth, and confined their ſheep, at night, in large ſheds built on purpoſe, whoſe floors were covered with ſand or virgin earth, &c. which the ſhepherd carted away every morning to the compoſt dunghill.

Our fatal domeſtic wars, during the reign of Charles I. changed the inſtruments of huſbandry into martial weapons; but after the death of that unfortunate monarch, artful and avaricious men crept into the confiſcated eſtates of the nobility, gentry, and clergy; and as many of theſe new encroachers had riſen from the plough, ſo they returned with pleaſure to their old profeſſion, being chiefly animated by the love of gain. Plattes, Hartlib, Blythe, and others, ſeized this favourable diſpoſition of the common people, and encouraged it by writings, which have ſince had few equals; nor was Cromwell wanting to lend his aſſiſtance.

Sir Hugh Platt was one of the moſt ingenious huſbandmen of the age in which he lived; yet ſo great was his modeſty, that all his works, except his Paradiſe of Flora, ſeem to be poſthumous. He held a correſpondence with all the lovers of agriculture and gardening in England; and ſuch was the juſtice and modeſty of his temper, that he always named the author of every diſcovery communicated to him. Perhaps no man, in any age, diſcovered, or, at leaſt, brought into uſe, ſo many new ſorts of manure. Witneſs his account of the compoſt and covered dunghill, and his obſervations on the fertiliſing qualites lodged in ſalt, ſtreet-dirt, and the ſullage of ſtreets in great cities, clay, fuller's-earth, mooriſh earth, dung-hills made in layers, fern, hair, calcination of all vegetables, malt-duſt, willow-tree earth, ſoap-boiler's aſhes, marle, and broken pilchards.

Gabriel Plattes may be eſteemed an original genius in huſbandry. He began his obſervations in the time of queen Elizabeth, and continued them through the reigns of James I. Charles I. and during the firſt three or four years of the commonwealth. But notwithſtanding the great merit of this writer, the public ſuffered him to ſtarve and periſh in the ſtreets of London; nor had he a ſhirt upon his back when he died.

Samuel Hartlib, a celebrated writer on huſbandry in the laſt century, was highly beloved and eſteemed by Milton, and other great men of that time. In his preface to a work commonly called his Legacy, he laments that no public director of huſbandry was eſtabliſhed in England by authority; and that we had not adopted the Flemiſh method of letting farms upon improvement. This remark of Hartlib procured him a penſion of one hundred pounds a year from Cromwell; and the writer afterwards, the better to fulfil the intention of his benefactor, procured Dr. Beati's excellent annotation on the Legacy, with other valuable pieces from his numerous correſpondents.

About the time when this author flouriſhed ſeems to have been an æra when the Engliſh huſbandry roſe to great perfection; for the preceding wars had made the country gentry poor, and, in conſequence thereof, induſtrious. They found the cultivation of their own lands to be the moſt profitable poſt they could occupy. But a few years after, when the Reſtoration took place, all this induſtry and knowledge were exchanged for diſſipation and heedleſſneſs; and then huſbandry paſſed almoſt entirely into the hands of farmers.

The famous work attributed to Hartlib, and called the Legacy, was only drawn up at Hartlib's requeſt; and, after paſſing through his correction and reviſal, was publiſhed by him. The real author of this treatiſe was R. Child. It conſiſts of one general anſwer to the following queſtion, namely, "What are the actual defects and omiſſions, as alſo the poſſible improvements, in Engliſh huſbandry?"

Several other pieces on huſbandry followed the publication of the Legacy, and greatly improved that neceſſary and uſeful art.

The firſt writer that inſpired his countrymen with a deſire of reviving the ſtudy of agriculture after the Reſtoration, was Evelyn; who, being followed by the famous Tull, opened a new ſphere for the minds of mankind to range in; and ſince this period ſeveral valuable improvements have been made in the Engliſh huſbandry, by a great variety of authors.

Ireland, about the middle of the laſt century, began to make no inconſiderable figure in the art of huſbandry. It muſt, indeed, be confeſſed that Ireland had very ſtrong prejudices in behalf of a very wretched method of agriculture, till about the middle of the laſt century, when Blythe opened the eyes of that people by his incomparable writings. Since which a certain ſpirit of improvement has, more or leſs, been promoted and carried on with great zeal and conſtancy by the nobility, clergy, and gentry of that kingdom. In proof of which it will be ſufficient to obſerve, that the tranſactions of the Dublin ſociety for encouraging huſbandry, are now cited by all foreigners in the Memoirs relating to that ſubject.

After the peace of Aix-la-Chapelle, almoſt all the nations of Europe, by a ſort of tacit conſent, applied themſelves to the ſtudy of agriculture; and continued to do ſo, more or leſs, amidſt the univerſal confuſion that ſoon ſucceeded. The French found, by repeated experience, that they could never maintain a long war, or procure a tolerable peace, without they raiſed corn enough to ſupport themſelves in ſuch a manner as they ſhould not be obliged to ſubmit to harſh terms on the one hand, or periſh by famine on the other. Their king, therefore, thought proper to give public encouragement to agriculture, and has even been preſent at the making of ſeveral experiments. The great and rich, of various ranks and ſtations, followed this example, and the very ladies put in for their ſhare of fame in this commendable undertaking. Even during the hurry and diſtreſſes of the laſt war, ſome attention was paid to agriculture. Prize queſtions were then propoſed annually in rural academies, particularly at the two academies of Lyons and Bourdeaux. And many alterations were made by the ſociety for improving agriculture in Britany.

Since the concluſion of the peace, matters have been carried on with great vigour. The univerſity of Amiens has made various propoſals to the public for the advancement of huſbandry; while the marquis de Tourbilly, a writer who proceeds chiefly on experience, has the principal direction of a Georgical ſociety, lately eſtabliſhed at Tours.

The ſociety of Rouen alſo deſerves our notice: the archbiſhop of the dioceſe is one of the members.

We ſhall only add on this ſubject, that there are at preſent ſocieties exiſting in France, eſtabliſhed by royal approbation, for the promoting of agriculture; and theſe thirteen ſocieties have nineteen co-operating ſocieties belonging to them, whenever it happened that a diſtrict was too large to be effectually taken care of by one ſociety.

The art of agriculture is, at preſent, publickly taught both in the Swediſh, Daniſh, and German univerſities, where the profeſſors may render effectual ſervice to their reſpective countries, if they underſtand the practical as well as the ſpeculative parts, and can converſe to as much advantage with the farmer and peaſant, as with Virgil and Columella.

Nor has Italy been inactive. The Neapolitans of the preſent age have condeſcended to return back to the firſt rudiments of revived huſbandry, and begun to ſtudy afreſh the agriculture of Creſcenzio, firſt publiſhed in the year 1478. The people of Bergamo have purſued the ſame track, and given the world a new edition of the *Ricardo d'Agricultura di Tarello*, which was originally publiſhed at Mantua in 1577.

The duchy of Tuſcany has imbibed the ſame ſpirit. A private gentleman left his whole fortune to endow an academy of agriculture. Even Ferrara, a ſmall territory in the papal dominions, has contributed its juſt contingent, and made ſome laudable attempts in huſbandry.

Animated with a deſire that the people under his government ſhould excel in huſbandry, his Sardinian majeſty ſent ſubjects to learn the practice of foreign countries, and made ſeveral attempts to eſtabliſh a better method of agriculture among his ſubjects.

In Poland, where a natural fertility of ſoil ſeems to diſpenſe with the neceſſity of calling in improvements, Mr. de Bieleuſki, grand-marſhal of the crown, made abundance of ſucceſsful attempts to introduce the new huſbandry among his countrymen, and procured the beſt inſtruments for that purpoſe from France and other parts of Europe.

The Hollanders give little attention to agriculture, if we except one ſingle collateral inſtance, namely, the draining of fens and moraſſes; and even that has proceeded more from the motive of ſelf-preſervation, than any particular turn towards huſbandry.

In the year 1759, a ſociety eſtabliſhed itſelf at Berne, in Switzerland, for the advancement of agriculture, and rural œconomics. That ſociety conſiſts of many ingenious private perſons, and alſo of ſome of great weight and influence in the republic; moſt of them men of a true caſt for the improvement of huſbandry, being enabled to join the practice with the theory. They publiſhed ſeveral uſeful pieces, which we have inſerted under their proper heads.

We muſt not omit to mention here, that Linnæus and his diſciples performed great things in the north of Europe, particularly in diſcovering new, profitable and well-taſted food for cattle. At the ſame time Sweden has beſtowed ſucceſsful labours on a ſoil, which was before looked upon as cold, barren, and incapable of melioration; of this the memoirs publiſhed at Stockholm will be a laſting monument.

Denmark, as well as many courts in Germany, follow the like example. His Daniſh majeſty encourages, in particular, the woollen manufacture; and the late king ſent three perſons into Arabia Felix, to make remarks, and bring over ſuch plants and trees as may be uſeful in huſbandry, building, &c.

At the ſame time the duchy of Wirtemberg, a country no ways unfavourable to corn and paſturage, has not failed to contribute its aſſiſtances towards the improvement of agriculture, having ſome time ago communicated to the public its œconomical relations from the preſs at Stutgard.

Nor have the learned of Leipſic and Hanover been inattentive to this great art of ſupporting human kind, and that amidſt all the rage and devaſtations of war; witneſs the *Journal d'Agriculture*, printed at Leipſic, and the *Recueils d'Hanovre*, printed at that city.

Even Spain, naturally inactive on theſe occaſions, in ſpite of all the prejudices of a bigoted religion, invited Linnæus, with the offer of a large penſion, to ſuperintend a college, founded for the ſake of making new enquiries into the hiſtory of nature, and the art of agriculture.

But England alone exceeds all modern nations in huſbandry; and there is reaſon to hope, from the ſpirit that now animates a great number of the nobility and gentry, that this uſeful art will, in a few years, be carried to a much greater degree of perfection than it ever yet reached in any age or country. The reſpectable patriots that form the ſociety eſtabliſhed at London, for the encouragement of arts, ſeem determined to contribute all that lies in their power towards the advancement of agriculture. They have already done much, and there is reaſon to hope they will do more. A vaſt variety of different machines for facilitating the practice of agriculture, have been ſent them in conſequence of their large premiums and bounties. Such munificence and attention to public proſperity may be truly called royal, as it would caſt a luſtre on the greateſt monarch that ever ſwayed a ſceptre. The late inſtitutions of ſocieties in different parts of the kingdom for agriculture, and the profeſſorſhip of agriculture lately eſtabliſhed at Edinburgh, cannot but promote the ſtudy, and point out the utility of it. We ſhall conclude this hiſtory, with obſerving, that the reader will find, under the proper articles, a more minute account of the various improvements that have been lately made in the different parts of Europe.

AGRIMONY, a troubleſome perennial plant in paſture grounds. It has generally a ſingle, round, rough ſtalk, with leaves placed alternately upon it, which are winged with ſmaller leaves placed between the larger pairs. The yellow flowers grow alternately along the ſtalk, in a long row, after the manner of a ſpike, and are ſucceeded by rough ſeeds.

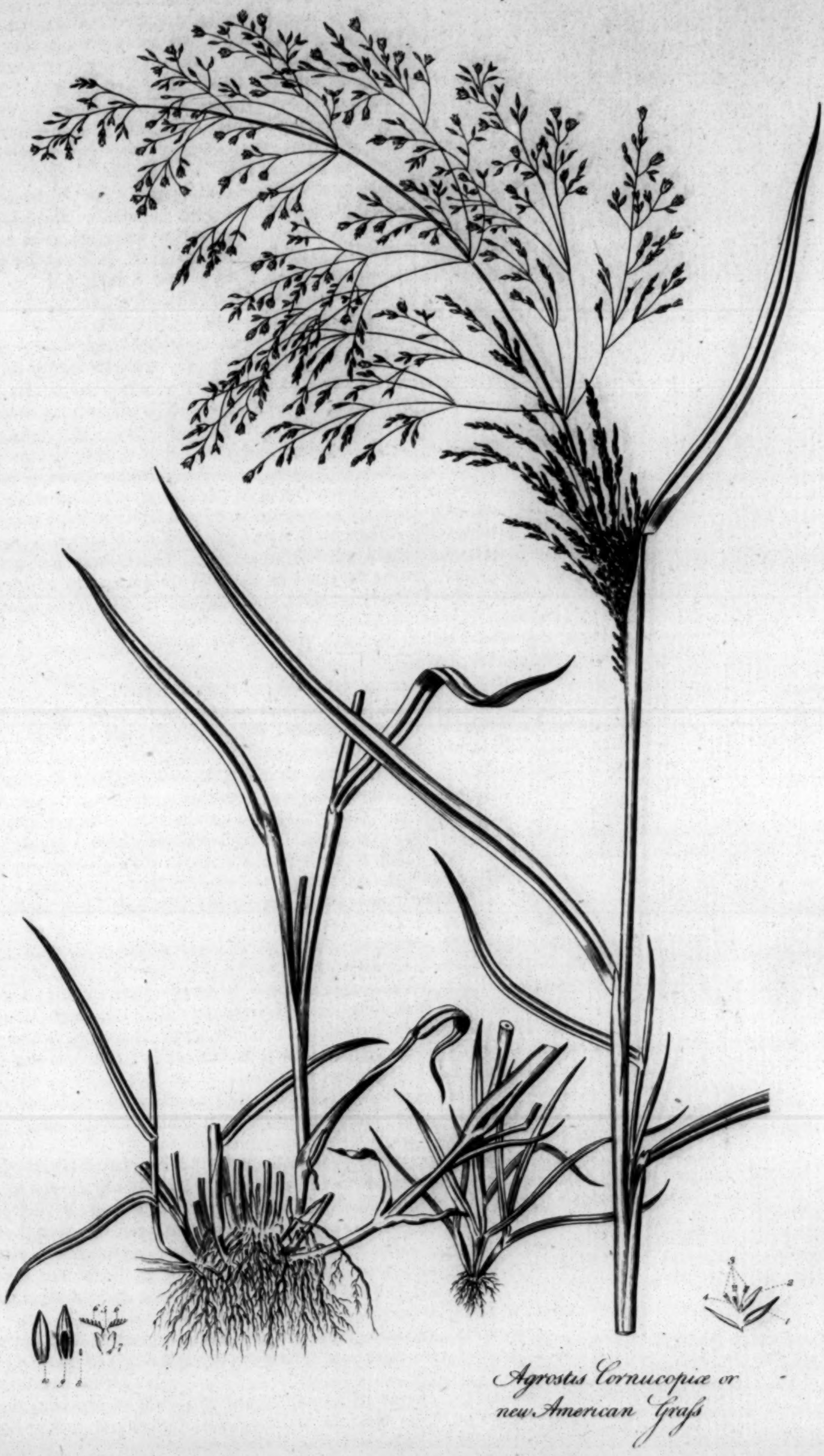
AGROSTIS CORNUCOPIA, or new American graſs, introduced into England lately. It was firſt introduced into Georgia, where it continues to flouriſh; and is found better than any other graſs for running amongſt the rocks, and ſtanding drought; but its chief excellence is, that not only cattle, horſes, and ſheep fatten upon it, but every ſpecies of poultry are fond of it. It is greatly favourable for making of graſs platts, being of a fine texture, and a beautiful verdure in this country throughout the year. The following experiments were made by Mr. Fraſer at Chelſea. A few ſeeds ſown Nov. 20, 1788, continued dormant all the winter. The plants made their appearance in the beginning of March. Flowered early in September, when they meaſured from three to four feet. Each root produced one hundred ſtems: each ſtem ſending forth branches, ſome from four to ſix, others as far as ten or twelve, bearing panicles for ſeed; each panicle from twelve to eighteen inches long. This ſhews the multiplication to be infinite. A ſmall quantity was ſown March 15, 1789. Seedlings tranſplanted, by dividing the roots on the 22d of May; began unexpectedly to flower in September, and completed their flowers nearly as early as thoſe ſown in November preceding. On the 9th of September, meaſured two feet five inches. Part of the bed cut cloſe to the ground on the 15th of Auguſt, meaſured, on the 9th of September, from twelve to ſixteen inches; and on the 10th of October twenty-two inches. The ſwarth much thicker than what had not been cut down. It then began to flower, from 100 to 200 panicles on each root.

Having cleaned a caſk of ſeed accidentally about the middle of April following, in a little hard gravelly court, about a month afterwards, to my ſurpriſe, I found the graſs coming up very thick; and it has continued in as flouriſhing a ſtate as any I have ſown in the garden.

Apprehending that the ſucceſs in the gravelly court was chiefly owing to the ſeeds not being buried in the ground, on the 15th of May I took a four-inch board, and laid out with it four drills twenty feet long, preſſing down the board in the drills ſo as to render the ſurface ſmooth and hard. I then took a gill of the ſeed and mixed it with a

PLATE 1 *

Facing Agr



Agrostis Cornucopiæ or new American Graſs

G.R. III
BRITISH MUSEUM

peck of mould and ſoot, and ſowed it in the drills, without any other covering. A very fine crop was the conſequence. On the 10th of October, it meaſured twenty-two inches high, and contained plants ſufficient to occupy half an acre. Same day ſowed four rows in the manner of muſtard and creſſes, about half an inch deep in the ground, covering it with mould. No plants came up.

From theſe experiments I concluded, that the proper management of this graſs is, that the ground ſhould be in extremely fine tilth, well cleaned, harrowed, and rolled with a heavy roller, before the ſeed is ſowed. A quart of ſeed to be mixed with a buſhel of light earth and ſoot.

On the 10th of October, I cut down a patch of graſs, which had been ſowed on the fourth of June. It meaſured twenty-ſeven inches. The part ſo cut down meaſured, on the firſt of November, twenty days after it was cut, nine inches. One ſeedling plant was divided the 22d of May into 200, and which were tranſplanted out, and cut down the 15th of Auguſt, meaſuring then twenty inches: one of theſe plants ſo tranſplanted was taken up in the preſence of a gentleman on the 10th of October, and divided into 201 plants, and planted into a bed; notwithſtanding ſo late in the year, they are flouriſhing. The above-mentioned ſeedling has, at this rate, multiplied itſelf into 4000 plants in five months. It might have been mutiplied into double or treble this number, by dividing the joints, as it propagates from them as well as by the root.

The greateſt part of the above experiments have been made in a garden, for want of a field to try them in: this, however, is equally concluſive as if it had been in a field, as the garden is a poor gravelly ſoil.

There is nothing now remains fully to aſcertain the great importance of this diſcovery, but to obſerve the effects of the winter on it in this country. And as it is now aſcertained to be a native of Canada, there can be little doubt that it will not be injured by the froſts in this climate; for the roots ſtrike very deep in the ground; a circumſtance which cannot fail to protect it during the ſevereſt froſt that can happen in winter, as well as the greateſt drought in ſummer.

Mr. Fraſer, in Feb. 1790, proceeds to give a farther account of this graſs, when he ſays it looks more like wheat in the month of May, than any thing elſe I can compare it to; ſome of the plants ſown early in March, meaſure three feet; one root has produced a hundred ſtems, from each of which branches, ſix or ſeven panicles for ſeed, ſome of which panicles meaſures upwards of eighteen inches long. Part of the above I tranſplanted the 22d of May, and cut cloſe to the ground the 15th of Auguſt, and then meaſured two feet five inches; that part which was cut is now twenty inches high, and what appears to me extraordinary, there is a ſhew of about 200 panicles on each root, and forms a thick ſwarth, and a much finer blade than that which was not cut. On the 10th inſtant, one of the ſaid roots was taken up in the preſence of Mr. Hudſon, author of the *Flora Anglica*, which was divided into 201, and was tranſplanted ſix inches apart, in order to obſerve what progreſs it might make in the courſe of the winter. *See Plate* I.

AIR, that thin, dilatable, and compreſſible body in which we breathe, and which ſurrounds the earth to a great height.

The air, beſides its various other uſes, is a principal cauſe of the vegetation of plants; an inſtance of which we have from Mr. Ray, in the Philoſophical Tranſactions, of lettuce-ſeed, that was ſown in the glaſs receiver of the air-pump, which was exhauſted, and cleared from all air, which grew not at all in eight days time; whereas ſome of the ſame ſeed, that was ſown at the ſame time in the open air, was riſen to the height of an inch and an half in that time; but the air being let into the exhauſted receiver, the ſeed grew up to the height of two or three inches in the ſpace of one week.

Another inſtance of the uſefulneſs of the air in vegetation, is the ſedum, which will puſh out roots without earth and water, and live for ſeveral months: and ſome ſort of aloes, if hung up in a room entirely ſecured from froſts, will remain freſh for ſome years, though they will ſenſibly loſe in their weight. Air is capable of penetrating the porous and ſpongy parts of plants, and being there contracted, of dilating itſelf again.

The air operates alſo within the bowels of the earth, and by its ſubtilty perſpiring through the pores, aſſiſts in the rarefaction, of the crudities of the earth, and in the diſpelling all ſuperfluous moiſture, entering into the very pores and veins of the trees, plants, herbs, &c. carrying along with it thoſe ſalts contained either in itſelf, or lodged in the earth: which ſalts or juices are altered according to the ſeveral figures or dimenſions of the different ſtrainers or veſſels of thoſe ſeveral plants which grow upon the ſame ſpot of earth, which is ſo impregnated with theſe ſalts: and thence thoſe varieties in taſte and ſmell proceed, notwithſtanding they all receive their nouriſhment from the ſame ſtock that is lodged in the earth.

The air alſo affects the branches, leaves, and flowers of trees, plants, and herbs, entering and perſpiring through them, and even through the bark and body of trees: and by the ſame kind of ſubtilty it does, by its refreſhing breezes, moderate the intenſeneſs of the ſun-beams, cooling, chearing, blowing, opening, and extending all the offspring of nature. The air fixes and inſinuates its aerial ſubſtance into the liquid ſap of vegetables: and, as all the agitations in nature proceed from the contrariety of parts inhabiting together, in this aerial and liquid ſubſtance, being mixed, cauſe the agitation and motion in vegetables, or, more properly, ſet it all into a ferment, whether it be in the roots, or in the ſtem; and it riſes by co-operation of the ſun, which is the third agent in vegetation, up to the top of a tree, &c. as liquids riſe by fire to the top of the containing veſſel.

The air, we find, produces a vibratory motion in ſeveral bodies; and, particularly in plants, the air-veſſels thereof perform the office of lungs: for the air contained in them ſometimes contracting, and ſometimes expanding, according as the heat is increaſed or diminiſhed, preſſes the veſſels, and eaſes them again by turns, and thus promotes a circulation of their juices, which could ſcarce be otherwiſe effected.

Air, ſays the learned Dr. Hales, is a fine elaſtic fluid, with particles of very different natures floating in it, whereby it is admirably fitted by the great author of nature, to be the breath or life of vegetables, as well as animals, without which they can no more live nor thrive than animals can. As a proof of the great quantities of air in vegetables, he refers to the third chapter of his excellent Treatiſe of Vegetable Statics, where he ſays, in the experiments on vines, the great quantities of air was viſible, which was continually aſcending through the ſap into the tubes: which manifeſtly ſhews what plenty of it is taken in by vegetables; and is perſpired off with the ſap through the leaves.

He adds ſeveral experiments, as to an apple-branch, apricot-branch, birch, and other plants, to prove the ſame thing.

And Dr. Grew has obſerved, that the pores are ſo large in the trunks of ſome plants, as in the better ſort of thick walking canes, that they are viſible to a good eye without a glaſs; but, with a glaſs, the cane ſeems as if ſtuck at top full of holes with great pins, ſo large as very well to reſemble the pores of the ſkin in the ends of the fingers, and ball of the hand.

In the leaves of pines, they likewiſe, through a glaſs, make a very elegant ſhew, ſtanding almoſt exactly in rank and file, through the length of the leaves. Whence it may be thought probable, that the air freely enters plants, not only with the principal fund of nouriſhment by the roots, but alſo through the ſurface of their trunks and leaves, eſpecially at night, when they are changed from a perſpiring, to a ſtrongly imbibing ſtate.

Dr. Hales likewiſe tells us, that in all thoſe experiments that he tried to this purpoſe, he found that the air entered very ſlowly at the bark of young ſhoots and branches, but much more freely through old bark; and that in different kinds of trees it had different degrees of more or leſs free entrance.

And likewiſe, that there is ſome air both in an elaſtic and unelaſtic ſtate, mixed with the earth (which may well enter the roots with the nouriſhment) he found by ſeveral experiments which he gives in the abovementioned treatiſe.

The excellent Mr. Boyle, in making many experiments on the air, among other diſcoveries, found, that a good quantity of air was produceable from vegetables, by putting grapes, plumbs, gooſeberries, peas, and ſeveral other ſorts of fruits and grain, into exhauſted and unexhauſted receivers, where they continued for ſeveral days emitting great quantities of air.

This put the curious Dr. Hales upon further reſearches to find out what proportion of air he could obtain out of the vegetables in which it was lodged and incorporated; and, from a vaſt variety of curious and accurate experiments, concludes, that air abounds in vegetable ſubſtances, and bears a conſiderable part in them: and, that if all parts of matter were only endowed with a ſtrongly attracting power all nature would then become one unactive cohering lump.

Wherefore it was abſolutely neceſſary, in order to the actuating this vaſt maſs of attracting matter, that there ſhould be every where mixed with it a due proportion of ſtrongly repelling elaſtic particles, which might enliven the whole maſs, by the inceſſant action between them and the attracting particles.

And ſince theſe elaſtic particles are continually in great abundance reduced by the power of the ſtrong attractors, from an elaſtic to a fixed ſtate, it was therefore neceſſary that theſe particles ſhould be endued with a property of reſuming their elaſtic ſtate, whenever they were diſengaged from that maſs in which they were fixed, that thereby this beautiful frame of things might be maintained in a continual round of the production and diſſolution of vegetable as well as animal bodies.

The air is very inſtrumental in the production and growth of vegetables, both by invigorating their ſeveral juices, while in an elaſtic active ſtate, and alſo by greatly contributing, in a fixed ſtate, to the union and firm connection of the ſeveral conſtituent parts of thoſe bodies, viz. their water, fire, ſalt, and earth.

To conclude, by reaſon of thoſe properties of the air before-mentioned, it is very ſerviceable to vegetables, in that it collects up and breaks open the clouds, thoſe treaſures of rain, which nouriſh the vegetable tribe.

The air alſo helps to waft or diſperſe thoſe foggy humid vapours which ariſe from the ſoil, and would otherwiſe ſtagnate and poiſon the whole face of the earth.

The air, by the aſſiſtance of the ſun, aſſumes and ſublimates thoſe vapours into the upper regions; and theſe foggy humid vapours are, by this ſublimation, and the coercive power of the air and ſun, rarefied, and made again uſeful in vegetation.

On the contrary, the air, which in ſo many ways is ſubſervient to vegetables, is alſo, upon ſome accounts, injurious and pernicious to them; not only to the ligneous, herbaceous, and flowery parts above, but alſo to the roots and fibres below the earth: for as the air penetrates deep into the ſoil, it is natural to conclude, that a dry, huſky, ſcorching air, may be very prejudicial to the tender fibres of new planted vegetables.

ALDER-TREE, the name of a tree very common in moſt parts of England. It hath male and female flowers, which are produced at remote diſtances on the ſame plant; the male flowers are digeſted into a long juli or catkin, which is looſe, imbricated, and cylindrical. The female flowers are collected into a conical ſcaly head, and are ſucceeded by ſcaly cones.

Theſe trees delight in a moiſt ſoil, where few other trees will thrive; they are propagated either by layers, or planting of truncheons about three feet in length. The beſt time for this is in February, or the beginning of March; theſe ſhould be ſharpened at one end, and the ground looſened with an inſtrument before they are thruſt into it; leſt, by the ſtiffneſs of the ſoil, the bark ſhould be torn off, which may occaſion their miſcarriage. Theſe truncheons ſhould be thruſt into the earth two feet at leaſt, to prevent their being blown out of the ground by ſtrong winds, after they have made ſtout ſhoots. The plantations ſhould be cleared from all ſuch weeds as grow tall, otherwiſe they will overbear the young ſhoots; but when they have made good heads, they will keep down the weeds, and will require no farther care.

If you raiſe them by laying down the branches, it muſt be performed in October; and by the October following, they will have taken root ſufficient to be tranſplanted out; which muſt be done by digging a hole, and looſening the earth in the place where each plant is to ſtand, planting the young trees at leaſt a foot and a half deep, cutting off the top to about nine inches above the ſurface, which will occaſion them to ſhoot out many branches.

The diſtance theſe trees ſhould be placed, if deſigned for a coppice, is ſix feet ſquare; and if the ſmall lateral ſhoots are taken off in the ſpring, it will very much ſtrengthen your upright poles, provided you leave a few ſmall ſhoots at diſtances upon the body thereof, to detain the ſap for the encreaſe of its bulk.

Theſe trees may be alſo planted by the ſide of brooks, as is uſual for willows, where they will thrive exceedingly, and may be cut for poles every fifth or ſixth year. This wood is in great requeſt with the turners, and will endure a long time under ground, or to be laid in water. *Miller's Gard. Dict.*

Alder makes an extraordinary fence againſt rivers and ſtreams, and preſerves the banks from being undermined by the water; becauſe it is always ſending ſuckers from the loweſt roots, which makes it very uſeful, where ſtreams wear away the banks, and are widening their courſe. *Mortimer's Huſbandry.*

Alder has one peculiar and beneficial property, namely, that no beaſt will crop it, be it young or old, which ſaves the great charge of fencing it after planting. *Ellis's Timber Tree improved.*

Mr. Marſhall, in his Rural Economy of Norfolk, ſays, the alder is obſerved to make the ground it grows on ſtill more boggy; and therefore ought for two reaſons never to be planted; namely, the injury to the land; and its own trifling value. He again ſays, it is a great nuiſance in meadows, and not only encumbers the ſpot it grows on, but is allowed on all hands to render moory ſoils ſtill more rotten. It is a vile inhabitant even in the neighbourhood of a meadow; for its ſeeds being blown about by the wind, are trodden by cattle into the ſoil, where, ſpringing up among the herbage, embitter the graſs and render it unpalatable to the ſtock.

ALLEY, in the new huſbandry, implies the vacant ſpace between the outermoſt row of corn on one bed, and the neareſt row to it on the next parallel bed. *See* BED.

The practice of the new huſbandry has already ſufficiently ſhewn, that too narrow alleys would hardly anſwer any of the ends for which they are intended; and, on the other hand, the making them too wide is a loſs of ground. About four feet, excluſive of the ſpaces or partitions between the rows of corn in the beds, is a good middling breadth.

It is not indeed neceſſary to make the alleys quite ſo wide in good ſoils: an intelligent huſbandman will eaſily judge what breadth is moſt proper. But what greatly merits the attention of every one, and ought never to be loſt ſight of, is, that wide alleys are more eaſily and much better ſtirred than thoſe which are narrower: for when an alley is wide, the large furrow in the middle of it may be cut deep, there being then ſufficient room to turn the earth over towards the rows; while, on the other hand, the earth, in too narrow alleys, cannot be ſtirred deep enough, nor can room be found for what is turned over out of the furrows, without danger of burying great part of the rows.

We will, therefore, ſuppoſe the general breadth of the alleys to be about four feet; but the whole of that breadth is not to be ploughed or ſtirred, either with the plough or cultivator, as ſoon as the field is ſown. Neither of theſe inſtruments ought to go too near the rows of corn, for fear of rooting up the plants; but a ſlip of earth about ſix inches wide ſhould be left untouched on the outſide of each bed; by which means the part of the alley that is to be ſtirred, will be reduced to the breadth of three feet; and even that is leſſened in the firſt ploughing before winter by a deep furrow which is then cut cloſe to, and all along thoſe ſix inch ſlips, and the earth taken out of each furrow is thrown into the great furrow in the middle of the alley, which it ſerves to fill and arch up. Theſe two ſide furrows make together a breadth of about eighteen inches, and conſequently leave, in the middle of the alley, a breadth of about eighteen inches more, on which is heaped up the earth thrown out of the two furrows: and thus the alleys remain all the winter.

The firſt hoeing in the ſpring ſhould turn the earth, heaped up in the middle of the alleys, back towards the rows of corn. The two furrows that were opened before winter are then filled up, and a new one is cut in the middle of the alley.

To perform the firſt hoeing with the common plough, which may be very eaſily done, two turns of that inſtrument will be requiſite, namely, one on each ſide of the alley, as near as poſſible to the beds. But as theſe two turns will not be always ſufficient to form the furrow perfectly, a great deal of earth frequently remaining between it and the bed, a third turn of the plough becomes often neceſſary; and ſometimes a fourth, to hollow the middle furrow as it ought to be.

If this work be performed with the cultivator with two mould-boards, the inſtrument muſt be placed in the middle of the alley, and the horſes in one of the two furrows. The ſhare will eaſily enter a great depth into the earth, which was laid there by the laſt hoeing before winter: and as the horſes advance, that great ridge of earth will be divided into two parts, which will be turned over into, and fill up the furrows that were made before winter, on each ſide of the alley, cloſe to the beds. *See the article* CULTIVATOR.

Thus the great furrow in the middle of the alley will be opened, and the whole operation performed by one turn of the cultivator. The earth thus turned over will be thoroughly ſtirred, and ſo much time and labour will be ſaved by this method, that the farmer may eaſily afford one or two ſtirrings more in the ſummer, which will always be of great ſervice. *M. de Chateauvieux.*

Wheat, in the new huſbandry, is uſually cultivated upon ridges of about four feet nine inches broad, and upon theſe ridges are drilled two rows of wheat, ten inches aſunder, the diſtance therefore between theſe double rows is near four feet; this diſtance, which M. de Chateauvieux here calls the alleys, was, by Mr. Tull, called the intervals, and the diſtances of the two rows of wheat upon the ridges he called partitions.

He at firſt made his ridges ſix feet broad, and drilled three or four rows upon each ridge; but upon further experience he found, that two rows upon a ridge of four feet nine inches broad, produced better crops than three or four rows upon ſix feet ridges, and he recommends theſe double rows to thoſe who would cultivate wheat with the hoe-plough.

It is likewiſe obſervable, that though in his early practiſe of horſe-hoeing wheat, he was cautious of bringing the hoe-plough very near the rows, he found afterwards that there was no danger in hoeing cloſe on the rows of corn, but, on the contrary, the crop was much improved by it, and that the plough in hoeing the earth from the rows, could not be brought too cloſe to them, unleſs it tore out any of the plants, inſomuch, that he ſays he could bring the plough within about an inch of the rows when the earth was in right temper for it.

The reaſon that M. de Chateauvieux directs, as above, that the hoe-plough ſhould not come cloſe to the rows by ſix inches, was becauſe he had not then ſeen Mr. Tull's laſt Improvements upon the Hoeing Culture, which was not publiſhed till ſeveral years after the firſt parts of the horſe-hoeing huſbandry was tranſlated into French.

The firſt horſe-hoeing of the wheat is performed in the beginning of winter, and the earth is ploughed away from the rows into the intervals, which forms ſmall ridges in the middle between the double rows. The ſecond hoeing is in the ſpring, which turns the back to the rows. The third hoeing is from the rows after the wheat has bloſſomed; this turns the earth into the intervals, forming ſmall ridges there as at the firſt hoeing. The fourth hoeing returns the earth to the ridges, which is performed a month or more after the third hoeing: this commonly finiſhes the horſe-hoeings if the land is in good heart, otherwiſe one or two more hoeings are neceſſary. The double mould board plough is uſeful to clear the furrows, and lay all the earth up in ridges after the laſt hoeing, but no cultivators ſhould be ſubſtituted in room of the hoe-plough.

ALMOND-TREE, is generally cultivated in gardens for the beauty of its flowers. Theſe often appear in February, when the ſpring is forward; but if froſt comes on after the flowers appear, their beauty will be of ſhort duration, and in thoſe ſeaſons few almonds are produced; whereas when the trees do not flower till late in March, they ſeldom fail to bear plenty of fruit; many of which will be very ſweet, and fit for the table when green, but they will not keep long.

Almond trees are propagated by inoculating a bud of theſe trees into a plum, almond, or peach-ſtock, in the month of July. The next ſpring, when the buds ſhoot, you may train them up, either for ſtandards, or ſuffer them to grow for half ſtandards, according to your own fancy.

The beſt ſeaſon for tranſplanting theſe trees, if for dry ground, is in October, as ſoon as the leaves begin to decay; but for a wet ſoil, February is much preferable: obſerve always to bud upon plum-ſtocks for wet grounds, and on almond or peach-ſtocks for dry. *Miller's Gard. Dict.*

AMBERVALIA, a ceremony practiſed by the ancient Romans, in order to procure from the gods a happy harveſt.

This ceremony conſiſted of a proceſſion in which the victims were conducted thrice round the corn fields before they were ſacrificed. Twelve prieſts walked at the head of the proceſſion, which conſiſted of all the neighbouring inhabitants, every one being crowned with leaves of oak, and ſinging hymns in honour of Ceres, the goddeſs of corn.

AMBLE, a peculiar kind of pace, wherein a horſe's two legs of the ſame ſide move at the ſame time.

In this pace the horſe's legs move nearer the ground than in the walk, and, at the ſame time, are more extended: but what is moſt ſingular in it is, that the two legs of the ſame ſide, for inſtance, the off hind and fore-leg, move at the ſame time; and then the two near legs, in making another ſtep, move at once; the motion being performed in this alternate manner, ſo that the two ſides are alternately without ſupport, or any equilibrium between the one and the other, which muſt neceſſarily prove very fatiguing to the horſe, being obliged to ſupport himſelf in a forced oſcillation, by the rapidity of a motion, in which his feet are ſcarcely off the ground. For if in the amble he lifted his feet as in the trot, or even in a walk, the oſcillation would be ſuch, that he could not avoid falling on his ſide, and it is only by keeping his feet very near the ground, and by the quick alternate motion that he ſupports himſelf in this pace, in which the hind leg is not only to move at the ſame time with the fore-leg of the ſame ſide, but alſo to gain on it, or touch the ground a foot, or a foot and a half, beyond the ſpot where the latter grounded. The further the hind-leg extends beyond the place where the fore-leg grounded, the better the horſe ambles, and the whole motion is proportionally faſter. Thus the whole difference between the amble and the trot conſiſts in this, that the two legs moving together in the latter are in a diagonal poſition, whereas, in the former, the two legs of the ſame ſide move together.

This pace, which is very fatiguing to the horſe, is very eaſy to the rider. It has not the roughneſs of the trot, which is cauſed by the reſiſtance of the fore-leg, at the lifting up of the hind; becauſe, in the amble, this fore-leg is lifted up at the ſame time with the hind-leg of the ſame ſide; whereas, in the trot, the fore-leg of the ſame ſide is at reſt, and reſiſts the impulſe during the whole time that the hind leg is in motion.

They who are ſkilled in horſemanſhip tell us, that horſes which naturally amble, never trot, and that they are a great deal weaker than others. Colts, indeed, very often move in this manner, eſpecially when they exert themſelves, and are not ſtrong enough to trot or gallop. Moſt good horſes, which have been over-worked, and on the decline, are alſo obſerved voluntarily to amble, when forced to a motion ſwifter than a walk.

The amble may, therefore, be conſidered as a defective pace, not being common, and natural only to a very few horſes, which, in general, are weaker than others. Add to this, that ſuch amblers as ſeem the ſtrongeſt, are ſpoiled ſooner than thoſe which trot or gallop. *Buffon's Hiſtoire Naturel, tom.* IV.

There are various methods of diſcipline for bringing a young horſe to amble: ſome chuſe to toil him in his foot pace through new ploughed fields, which naturally inures him to the ſtroke required in the amble; but this diſorderly toil is very apt to weaken, and ſometimes to lame a young horſe. Others attempt it by ſtopping him in a gallop, or trot; ſo that by loſing both, he neceſſarily ſtumbles on an amble; but this is apt to ſpoil a good mouth and rein, and expoſes the horſe to the danger of an hoof reach, or ſinew ſtrain, by over-reaching, &c.—Some prefer ambling by weights as the beſt way, and in order to do this, either overload the horſe with exceſſive heavy ſhoes, or fold thick pieces of lead about the fetlock paſterns, without conſidering that the former are apt to make him interfere, or ſtrike ſhort with his hind-feet; and that the latter, beſides that miſchief, expoſe the horſe to incurable ſtrains, cruſhing of the coronet, breeding of ring-bones, &c. Others load the horſe with earth, lead, &c. which often occaſion a ſwaying of the back, overſtraining of the fillets, &c. Some endeavour to make him amble in hand, before they mount his back, by means of ſome wall, ſmooth pale or rail, and by checking him in the mouth with the bridle-hand, and correcting him with a rod on the hinder hoofs, and under the belly, when he treads falſe; but this is very apt to ſpoil a ſpirited horſe, even before he can underſtand what you would have him do.

The beſt method ſeems to conſiſt in trying with your hands, by a gentle and deliberate racking and thruſting of the horſe forwards, by helping him in the weak part of his mouth with your ſnaffle, which muſt be ſmooth, big, and full; and correcting him firſt on one ſide, then on the other, with the calves of your legs, and ſometimes with a ſpur. If you can by this means make him fall readily into an amble, though in a ſhuffling and diſorderly manner, much labour will be ſaved; for that aptneſs to amble will render the tramel more eaſy to him, and he will find the motion without ſtumbling, or being frighted. *See the article* TRAMEL. *Bradley's Dict. Ruſt.*

AMEL-CORN, the ſame with ſpelt. *See* SPELT.

AMERICAN GRASS. See AGROSTIS CORNUCOPIA.

ANBURY, a kind of wen, or ſpongy wart growing on any part of a horſe's body. *See the article* WEN.

ANGORA *goat*. *See the article* GOAT.

ANJOU *cabbage-ſhrub*, an excellent vegetable both for the kitchen and the food of cattle, cultivated with great ſucceſs in ſeveral provinces of France; and that ingenious huſbandman, the marquis of Turbilly lately ſent a parcel of the ſeeds to our ſociety for the encouragement of arts, who very readily diſtributed them to ſuch gentlemen as applied to them for that purpoſe, in order to their being cultivated here: ſo that there is reaſon to hope, that this uſeful plant will ſoon become common in England. The following inſtructions are given by the marquis de Turbilly, for cultivating the Anjou cabbage.

"The great Anjou cabbage is one of the moſt uſeful leguminous plants for country people. It will grow in almoſt any ſoil, not excepting even the moſt indifferent, provided it be ſufficiently dunged. It is but little known about Paris, and in many other places, where it might be cultivated to great advantage.

"The ſeeds of this cabbage are commonly ſown in June, in a quarter of good mould, in the kitchen garden, and watered from time to time in caſe of drought. The plants will riſe pretty ſpeedily, and ſhould be thinned ſoon after, wherever they ſtand too thick. The next care is to keep them free from weeds whilſt they continue, by hoeing the ground between them. About the firſt of November they ſhould be tranſplanted into the field where they are to remain. They ſhould be planted there in trenchers dug with a ſpade, pretty deep, that is, they ſhould be buried almoſt up to the leaves. The diſtance between them ſhould be two feet, or two feet and a half every way, according to the goodneſs of the ſoil. Particular care ſhould be taken never to plant them with a dibble, as gardeners plant other ſorts of cabbages. A layer of dung ſhould be ſpread along the bottom of the trench, and the roots of the tranſplanted cabbages covered therewith. The mould taken out ſhould then be returned back upon the dung; and as the trench will then no longer hold it all, there will remain a ridge between each row of cabbages.

"Towards the middle of May enſuing, the ground ſhould be well ſtirred between the plants, with a ſpade, or ſome other proper inſtrument, and its whole ſurface laid quite level. After this, nothing more remains to be done, except pulling up the weeds, from time to time, as they appear.

"Many huſbandmen ſow the ſeeds of theſe cabbages with thoſe of hemp; and though this may not be ſo ſure as the former, it often ſucceeds very well, eſpecially in wet years. When the hemp is pulled up, a multitude of little cabbages are ſeen, and which having then a free air, grow apace. They are tranſplanted about the firſt of November in the manner before directed, and are preferred to thoſe of the kitchen garden, becauſe they are not ſo apt to run up to ſeed the next ſpring; an accident which ſometimes happens to a few of theſe cabbages, in certain years; and it then becomes neceſſary to replace them by others which have not run up, and which are reſerved for this purpoſe in a ſeparate ſpot of ground.

"Several farmers uſe a plough to cut the trench for tranſplanting theſe cabbages; but then they do not remove them till the ſpring, leaving them, in the mean time, in the place where they were ſown. They afterwards give the earth a ſtirring with the ſpade, and lay it ſmooth towards the end of May, in the manner before directed. Whole fields of theſe cabbages may be ſeen on many farms in Anjou and Poitou, and which prove a very uſeful reſource.

"In the month of June, ſuch of theſe cabbages as are already large, and do not turn in their leaves for cabbaging, but ſtill continue green, begin to be fit for uſe, and ſoon arrive at their full perfection, which they retain till the next ſpring, when they begin to run up, and afterwards bloſſom. Their ſeeds ripen towards the end of July, and what is intended for ſowing ſhould then be gathered.

"In Anjou, when theſe cabbages are entirely run up, they generally grow to the height of ſeven or eight feet: ſometimes they reach to eight feet and a half, or nine feet; nay, ſome have even been ſeen of a greater height.

"From the month of June, when theſe cabbages begin to be fit for uſe, their leaves are gathered from time to time, and they ſhoot out again. They are large, excellent food, and ſo tender that they are dreſſed with a moment's boiling. They never occaſion any flatulencies or uneaſineſs in the ſtomach; and are alſo very good food for cattle, which eat them greedily. They likewiſe greatly increaſe the milk of cows.

"Such are the properties of this kind of cabbage, greatly eſteemed in Anjou, Poitou, Brittany, Le Maine, and ſome other neighbouring provinces. In Anjou, farmers are bound by their leaſes to plant yearly a certain number of theſe cabbages, and to leave a certain number of them ſtanding when they quit their farms.

"This cabbage forms a kind of ſhrub, the great utility of which may be gathered from this, that its leaves afford nouriſhment to men and cattle; and its ſtalk, which is about the thickneſs of one's wriſt, is uſed, when dry, for fuel.

"It ſometimes happens in extremely ſevere winters, that ſome of theſe cabbages are frozen; and this, in the above provinces, is conſidered as a very great loſs; but that accident is rare, becauſe this kind of cabbage reſiſts froſts better than moſt others.

"The ground where theſe cabbages are planted ſhould be fenced in very carefully by hedges or ditches, to preſerve it from the depredations of cattle, which are extremely fond of them. With this precaution I have made ſeveral plantations of them, near the houſes erected in the midſt of the heaths and commons I have broken up and improved; and they have ſucceeded very well, though the ſoil is but indifferent in many places.

"I have, near my houſe in Anjou, two well encloſed fields, deſtined for this ſort of plantation. They are planted alternately every year with young cabbages. When theſe are pulled up, after they have ſeeded in the ſecond year, at the time already mentioned, the ground where they ſtood is dug up, and ſowed with peaſe or beans, the crop of which being taken off before the firſt of November, makes room for planting new cabbages at the proper ſeaſon. The ſoil is looſened and enriched by the peaſe and beans, and by this means the land is never reſted; nor is it ever exhauſted, becauſe it is dunged whenever the cabbages are planted.

"Theſe cabbages are of ſuch excellent ſervice to me, that I have often wondered at their not being cultivated in all the different countries of Europe. I believe they would ſucceed every where, and I adviſe all huſbandmen to make plantations of them.

"I wiſh that this ſhort memoir, founded on my own experience, may contribute to extend the culture of this uſeful plant."

ANNOTA is an ingredient made uſe of to colour cheeſe, a vegetable production brought from America, and brought to England originally for the uſe of dyers. It is the produce of Bixa Orellana of Linnæus. It is deſcribed by Miller in its plant and propagation. It is a tall ſhrub ſomewhat in reſemblance to the lilac. The colouring material is the pulp of the fruit; among which the ſeeds are bedded, in the ſame manner as thoſe of the roſe in the pulp of the hip. It has been tried as a colouring of cheeſe in its genuine ſtate, but without ſucceſs. The preparation in uſe is made by the druggiſt, and ſold in the ſhops. In colour and contexture it is not unlike well-burnt red brick. The hardeſt and cloſeſt is eſteemed the beſt. The method of uſing it is thus: a piece of the preparation is rubbed againſt a hard ſmooth even-faced pebble or other ſtone, the pieces being previouſly wetted with milk to forward the levigation, and to collect the particles as they are looſened. For this purpoſe a diſh of milk is generally placed upon the cheeſe-ladder; and as the ſtone becomes loaded with levigated matter the pieces are dipped in the milk from time to time; until the milk in the diſh appear (from daily practice) to be ſufficiently coloured.

The ſtone and the "colouring" being waſhed clean in the milk, it is ſtirred briſkly about in the diſh; and, having ſtood a few minutes for the unſuſpended particles of colouring to ſettle, is returned into the cheeſe-cowl; pouring it off gently, ſo as to leave any ſediment which may have fallen down, in the bottom of the diſh. The grounds are then rubbed with the finger on the bottom of the diſh, and freſh milk added; until all the finer particles be *ſuſpended*: and in this the ſkill in colouring principally conſiſts. If any fragments have broken off in the operation, they remain at the bottom of the diſh: hence the ſuperiority of a hard cloſely textured material, which will not break off or crumble in rubbing.

The price of annota is about ten pence an ounce; which will colour about twenty thin cheeſes (10 to 12 pounds each). The colouring therefore coſts about a halfpenny a cheeſe.

ANNUAL *plants*, ſuch as continue one year only: or ſuch as ſpring up, ripen their ſeed, and periſh in that ſpace of time. Thus wheat, barley, oats, beans, peaſe, &c. are annual plants.

ANNUAL *meadow-graſs*, called in ſome parts of England, Suffolk-graſs, a ſpecies of very beautiful graſs, making the fineſt turfs, and ſeems particularly well adapted to dairy farms. *See* Plate I. fig. 1. *which repreſents this graſs in its perfection.*

"I have, ſays Mr. Stillingfleet, ſeen whole fields of it in High-Suffolk, without any mixture of other graſſes, and as ſome of the beſt ſalt butter we have in London comes from that country, it is moſt likely to be the beſt graſs for the dairy." He adds, that he obſerved, upon Malvern-hill, a walk made there for the convenience of the water drinkers, which was, in many places, covered over with this graſs in leſs than a year, though he could not find a ſingle plant of it beſides in any other part of the hill. This was doubtleſs owing to the frequent treading which has the greateſt tendency to make this graſs flouriſh; and therefore it is very evident, that rolling muſt be very ſerviceable to it. As the flowers and ſtems of this plant do not grow brown ſo ſoon as thoſe of other graſſes, nor cover the radical leaves ſo much, becauſe they are conſiderably ſhorter, this affords a more pleaſing turf than any other graſs." *Stillingfleet's Miſcel. Tracts.*

Mr. Ray obſerves of the common meadow graſs, that it is a ſlender and ſucculent plant, very agreeable to cattle, and a fattener of them; that it delights in a rich ſoil; and that it is not injured by being trodden under foot, and therefore is commonly found along the ſides of paths and roads. It ſpindles and ears in the ſpring, and continues to ſhoot during the whole ſummer. *Ray's Hiſtory of Plants.*

As plenty of the ſeeds of this graſs might be very eaſily procured from Suffolk, it might be propagated and cultivated in all parts of England, where the ſoil and ſituation are adapted to its growth.

It is indeed amazing, that amidſt the great variety of graſſes that grow naturally in England, that ſo few farmers have had any thoughts about improving their meadows and paſtures; they ſeem to take every thing upon truſt, imagining, perhaps, that the graſs they find growing naturally in their grounds, is much better, and more adapted to the nature of the ſoil, than any other they could ſow, or adopt in its ſtead.

But this is ſurely a very narrow way of thinking, and ſhould it be encouraged, would ſoon put a ſtop to all improvements in huſbandry. We have been too long influenced by cuſtom: it is time for us to ſhake off our fetters, and rouze ourſelves from the deep lethargy which has prevented us from perceiving, or at leaſt from removing the diſadvantages of the old huſbandry, which in many reſpects is highly diſadvantageous both to the farmer and his country.

ANTICOR, a diſeaſe among horſes, conſiſting of a malignant ſwelling in the breaſt; which extends ſometimes to the very ſheath under the belly; and is attended with a fever, great depreſſion and weakneſs, and a total want of appetite.

The cure ſhould be firſt attempted by large and repeated bleedings, to abate the inflammation; emollient clyſters ſhould be injected twice or thrice a day, with an ounce of ſal prunella in each. The ſwelling ſhould be bathed with marſhmallow ointment, and an opening poultice, with onions boiled in it, ſhould be daily applied over it. If by this method continued four or five days, the inflammation in the throat and gullet be removed, the attention ſhould more particularly turn to encourage the ſwelling on the breaſt, and bring it, if poſſible, to matter: let the poultice therefore be continued, and give the horſe two ounces of Venice treacle, diſſolved in a pint of beer, every night. When the ſwelling is grown ſoft, it muſt be opened with a knife, and dreſſed with turpentine digeſtive, the danger being then over.

But ſhould it be found impracticable to bring the ſwelling to matter, and the ſwelling upwards ſhould increaſe ſo as to endanger ſuffocation, authors have adviſed to pierce the humour with a hot pointed cautery, and dreſs part with the turpentine digeſtive, ſharpened with a ſmall quantity of Spaniſh flies and euphorbium in powder, in order to ſtimulate and promote a greater diſcharge; at the ſame time fomenting and bathing the adjacent parts with ointment of marſhmallows.

M. Gueriniere, as well as Soleyſel, have adviſed opening the ſkin, when the tumour cannot be brought to matter, in order to introduce a piece of black helebore-root ſteeped in vinegar, and to confine it there for twenty-four hours; this alſo is intended as a ſtimulant, and is ſaid to anſwer the intention, by occaſioning ſometimes a ſwelling as big as a man's head. *Bartlet's Farriery.*

ANTS, or *piſmires*, are injurious both to paſture lands and gardens; in the former by throwing up hills, and in the latter, by feeding on the fruit, &c.

The method of keeping them from trees is by encompaſſing the ſtem with a circle or roll of wool, newly plucked from the ſheep's belly, four fingers in breadth, or by laying ſaw-duſt round the tree. The ſame will be effected when you anoint the tree with tar; but as tar is prejudicial to trees, human ordure, will, perhaps, do better; becauſe if any of it be put into their hills, it will kill them. *Mortimer's Huſbandry.*

ANT-*hills*, the habitations of the ants, conſiſting of little eminences, compoſed of ſmall particles of ſand, lightly and artfully laid together.

Theſe hills, or habitations of the ants, though very convenient for themſelves and their own ſocieties, are very deſtructive to the farmer, depriving him of as much land as theſe hills cover; which may be often computed at a tenth part, or more of his valuable graſs lands. Nay, in ſome places, where negligence has ſuffered them to multiply, almoſt half of it has been rendered uſeleſs: the hills ſtanding as thick together as graſs-cocks in hay time: and what is moſt ſurpriſing, this indolence is defended by affirming, that the area or ſuperficies of their land is thereby encreaſed: whereas it is well known, by the induſtrious, that very little or no graſs ever grows thereon; and therefore if the ſurface be encreaſed, the produce is proportionably decreaſed. *See the article* MOLE-HILL.

It has been a cuſtom in many places at the beginning of winter, and often when the weather was not very cold, to dig up the ant-hills, three or four inches below the ſurface of the ground; and then to cut them in pieces, and ſcatter the fragments about: but this only diſſeminates the inſects inſtead of deſtroying them; they can hide themſelves among the roots of the graſs for the preſent; and then collect themſelves together again upon any little eminence, of which there are great numbers ready for their purpoſe, viz. the circular ridges round the hollows, where the hills ſtood, as is very ſoon viſible to a curious obſerver. A much better method ſeems therefore to be pointed out by a writer in the *Muſeum Ruſticum*, vol. vi. namely, to cut off the hills entire, and even with the ſurface; and to let them lie whole at a little diſtance, with their bottom upwards: by this means the ants, which are known to be very tenacious of their neſts, will continue in their habitations, while the rains, by running into their holes of communication, aſſiſted afterwards by the froſts, which will now ſooner penetrate to their dwellings, will deſtroy them. Perhaps a little ſoot ſown on the places, and waſhed in with the rains, would have a better effect. The hills when rendered mellow by the froſts, may be broken and diſperſed about the land. This method of cutting the hills even with the ſurface, has one advantage; it leaves the paſture-land even and fit for mowing; and at the ſame time the little eminences being taken away, the inſects are expoſed to the wet, which is diſagreeable to them.

In wet weather theſe inſects accumulate cavernous heaps of ſandy particles among the graſs, called by the labourers ſprout-hills; which quickly take off the edge of a ſcythe. Theſe hills, which are very light and compreſſible, the above writer aſſures us from experience, may be readily ſtamped down, by the feet of the hay-makers, and the inſects, together with their eggs and earth, eaſily pounded to a mortar. This ſhould be repeated a ſecond, and perhaps a third time, after the itinerant foragers have returned from their queſt of food, and have begun to raiſe new ſtructures near the old demoliſhed habitations.

Mr. Marſhall, in his Rural Economy of Norfolk, ſays, that a tenant had leave to cut and burn ant-hills off a dole belonging to his farm upon a common. His motive was his improvement of his farm by the aſhes; and his pretext the improvement of the common: both of which he obtained. He levelled the ground and raked in graſs-ſeeds. His proceſs was to cut them up with a heart-ſhaped ſharp ſpade or ſhovel, in irregular lumps of ten to fifteen inches diameter, and from two to five or ſix inches thick. Theſe he turned the graſs downward, until the mould-ſide was thoroughly dry, and then he ſet up the graſs outward until they were dry enough to burn. He kindled the fire with bruſh-wood and kept it ſmothering, by laying the ſods or lumps on gradually, as the fire broke out, until ten or fifteen or twenty load of aſhes were raiſed in one heap, which the workmen agreed to complete the proceſs for a ſhilling each load of aſhes. Beſides the deſtruction of the ants, this is a cheap way of raiſing manure; and no man, having ſuch an opportunity in his power, ought to neglect it. On ſome ſoils aſhes are found in themſelves an excellent manure; and, perhaps generally, aſhes raiſed in this way would be found highly advantageous as bottoming for farm-yards and dunghills.

Mr. Young, in his ſixteenth volume of the Annals of Agriculture, recommends, as a ſingular experiment, the rolling down ant-hills, inſtead of cutting them; ſays he rode over a large paſture which he ſhould not have known had ever been infeſted with theſe hills, if he had not been aſſured that it was once covered with them. No other method was uſed but repeated rollings, with a very heavy roller.

APHERNOUSLI, or *arkenouſli*, a ſpecies of pine, or pinaſter, growing wild on the Alps, where one would think it impoſſible that any tree could vegetate and proſper; and therefore would probably thrive to great advantage on our bleak, barren, rocky, mountainous tracts of land. *See* Plate I. fig. 2.

The timber is large, and has many uſes, eſpecially within doors, or under cover. The branches reſemble thoſe of the pitch-trees, commonly called the ſpruce fir: but the cones are more round in the middle, being of a purpliſh colour, ſhaded with black. The bark of the trunk, or bole of the tree, is not reddiſh like the bark of the pine, but of a whitiſh caſt, like that of the fir. The huſk, or ſort of ſhell, which incloſes the kernels, is eaſily cracked, and the kernels are covered with a brown ſkin, which peels off; they are about as large as a common pea, triangular like buck-wheat, and white and ſoft as a blanched almond, of an oily agreeable taſte, but leaving in the mouth that ſmall degree of aſperity, which is peculiar to wild fruits, and is not unpleaſing. Theſe kernels make a part ſometimes in a Swiſs deſert; they ſupply the place of muſhroom-buttons in ragouts; and are alſo recommended in conſumptive caſes, on account of their balſamic oil.

Wainſcoting, flooring, and other joiner's work, made with the planks of aphernouſli, are of a finer grain, and more beautifully variegated than deal, and the ſmell of the wood is more agreeable. From this tree is extracted a white odoriferous reſin.

The aphernouſli is of a healthy, vigorous nature, and will bear removing when it is young, even in dry warm weather. The wood makes excellent firing in ſtoves, ovens, and kilns; but is dangerous to be uſed on the hearth or in grates, being apt to ſplinter and fly to a conſiderable diſtance.

This tree is the *pinus cembra* of Matthioli and Linnæus, the *pinus foliis quinis* in Haller, *the larix ſemper-virens* in the German Ephemeris, the *libanus carpathius* of ſome writers, and the *pina cinque feüeilles*, N° 20. in Du Hamel. It grows in great abundance on the moſt mountainous and coldeſt parts of the Briançonnois, where it is called by the natives *alviez*. It bears ſome reſemblance to the white Canada pine, which is better known in England by the name of Weymouth-pine. *Eſſays on Huſbandry.*

APIARY, a bee-garden, or place where bees are kept. *See the article* BEES.

APOPLEXY, or, as the farriers generally call it, the *ſtaggers*, a diſeaſe to which the horſe is ſubject, and by which the creature drops down ſuddenly without ſenſe or motion, except a working of his flanks, proceeding from the motion of the heart and lungs, which never ceaſe while any ſpark of life remains.

The previous ſymptoms are drowſineſs, watery moiſt eyes, ſomewhat full and inflamed, a diſpoſition to reel, feebleneſs, a bad appetite, and almoſt continual hanging of the head, or reſting it in his manger, ſometimes with little or no fever, and ſcarce any alteration in the dung or urine. When the apoplexy proceeds from water collected in the ſinuſes and and ventricles of the brain, the horſe has generally, beſides all the foregoing ſymptoms, a diſpoſition to rear up, and is apt to fall back, when any one goes to handle him about his head. The reaſon of his falling backwards ſeems to be obvious, becauſe when the head is raiſed with his mouth upwards, the water in the ventricles cauſes a weight upon the cerebellum, or part lying under the brain, and origin of the nerves, ſo as to deprive the creature of ſenſe and motion at once: this does not, however, prove ſuddenly mortal. Young horſes are moſt ſubject to it, and, with proper helps, and good uſage, ſometimes get over it: but when the apoplexy proceeds from wounds or blows on the head, or from any other cauſe producing ruptures in the blood-veſſels, or from matter collected in the brain, or its membranes; or if any part of the brain or its membranes be indurated, or grown callous, by long continuance, the horſe will not only have moſt of the ſymptoms already deſcribed, but will be frantic by fits, eſpecially after his feeds, ſo as to ſtart and fly into motion at every thing that comes near him. Theſe caſes are extremely dangerous, and ſeldom admit of a perfect recovery. But when horſes fall down ſuddenly and work violently at their flank, without any ability to riſe, even after plentiful bleeding, ſuch horſes ſeldom recover.

All that can be done in ſuch caſes is to ſtrike the veins in ſeveral places at once, to raiſe up the horſe's head and ſhoulders, propping them with plenty of ſtraw; and if he ſurvive the fit, to cut ſeveral rowels; though in caſe of ruptured veſſels, or if any kind of extraneous matter be lodged in the brain, or its membranes, all theſe helps will be of little ſervice.

But if the apoplectic fits happen to be only the effect of a plethora, or fulneſs of blood, from high feeding, and want of ſufficient exerciſe; or if it be the effect of a ſizy blood, which is often the caſe of many young horſes, that have been fed for ſale, or from catching cold while the blood is in this ſtate, the cure will not be attended with any great difficulty, notwithſtanding a horſe, in theſe circumſtances, may reel and ſtagger, and ſometimes fall down ſuddenly.

Firſt of all bleed plentifully, and keep the horſe for ſome time to an opening diet of ſcalded bran, and ſometimes ſcalded barley, leſſening the quantity of his hay. After two days repeat the bleeding, but in a ſmaller degree. If the horſe has a cold, it will be proper to give him pectoral drinks, proper for that diſorder. *See* COLD.

But if no ſymptom of a cold appears it will be neceſſary, after bleeding and a ſpare diet, to give him two or three purges, not only to remove the plethora or fulneſs, but attenuate and thin his blood, for which the following is recommended.

“ Take of the fineſt ſoccotrine aloes, an ounce and a quarter; freſh jalap, two drams; ſalt of tartar, three drams; native cinnabar, or the cinnabar of antimony half an ounce; make it into a ball with a ſufficient quantity of ſyrup of roſes or marſhmallows; adding twenty or thirty drops of chemical oil of aniſeeds, making the whole into a ball, rolling it in liquorice-powder.”

The purge may be made ſtronger or weaker by increaſing or diminiſhing the jalap. Let this be repeated two or three times, and the horſe will probably recover, without a relapſe. Powder of antimony, or its preparations, as the liver, the *crocus metallorum*, its cinnabar, or the native cinnabar, mixed with equal parts of gum guiacum, may be alſo given in ounce doſes, for three or four weeks to mend his blood, and take off its ſizineſs. Nor ſhould exerciſe, as ſoon as the horſe is able to bear it, be omitted.

When a horſe drops down ſuddenly with hard riding, or violent driving, it in many reſpects reſembles an apoplexy, and all the organs of the head are affected as in an apoplexy; but as this proceeds only from the extraordinary rarefaction of the blood, and its rapid motion, whereby the ſmall veſſels of the brain, heart, and lungs, are ſo extremely diſtended as to cauſe an univerſal preſſure on the origin of the nerves; the horſe by this means loſes all ſenſe and motion, and generally falls ſuddenly, eſpecially upon any ſudden ſtop; becauſe when the bodily motion ceaſes, the circulation of the blood in the veins is not accelerated in proportion to its influx from the arteries, which ſoon produces a ſuffocation

PLATE. I. *Facing* APHERNOUSLI.

Annual Meadow Graſs.

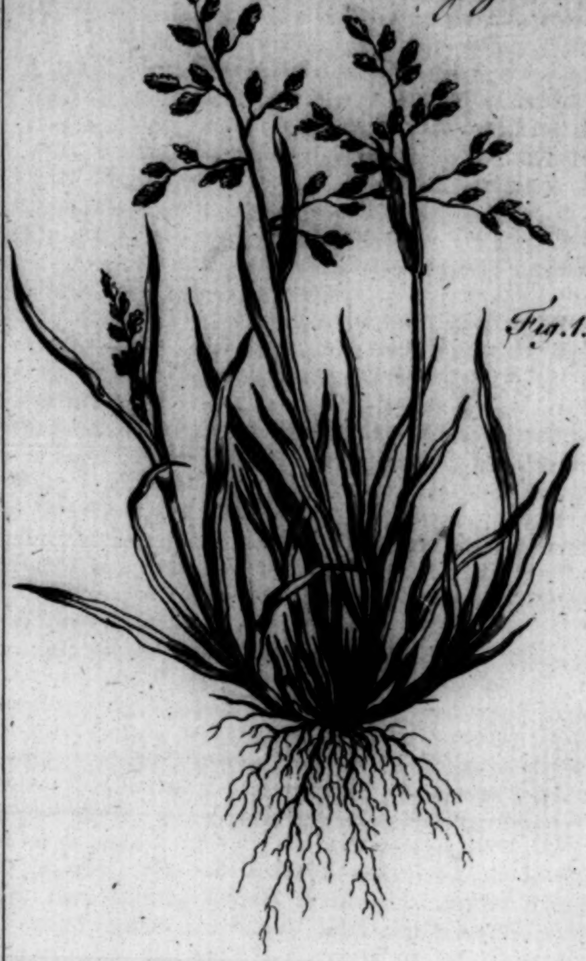


Fig. 1.

A Branch of the Aphernousli.

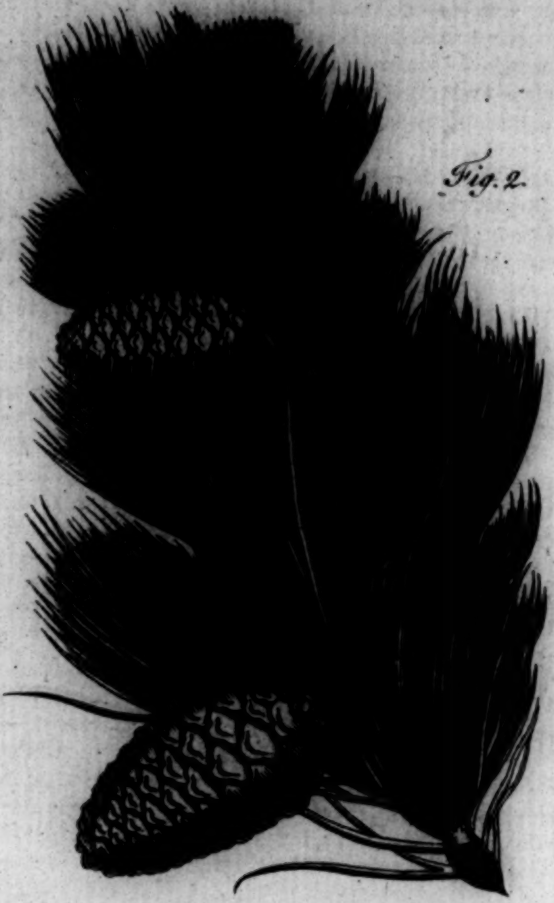


Fig. 2.

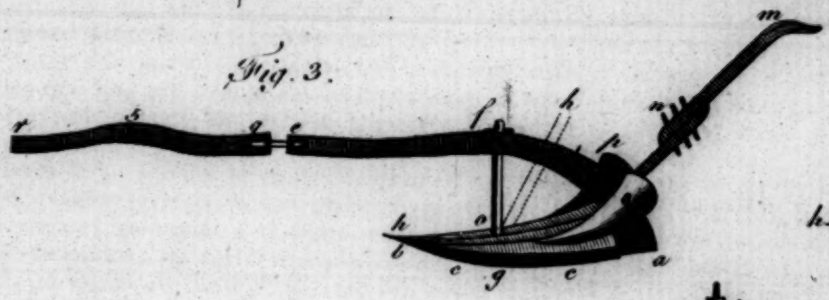


Fig. 3.

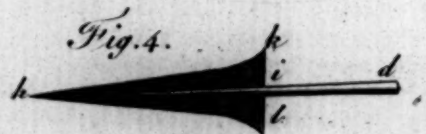


Fig. 4.

Archimeds's Screw

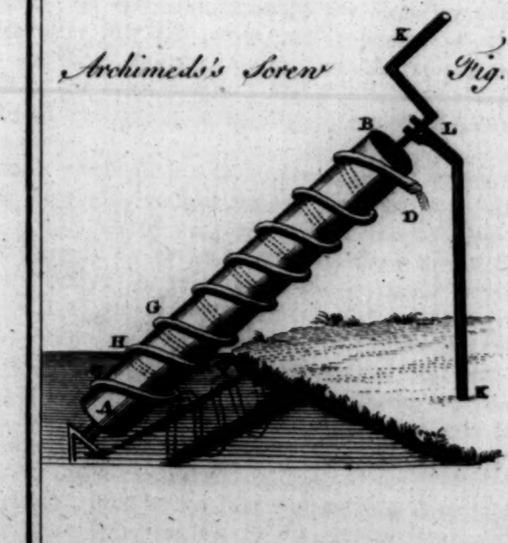


Fig. 5.

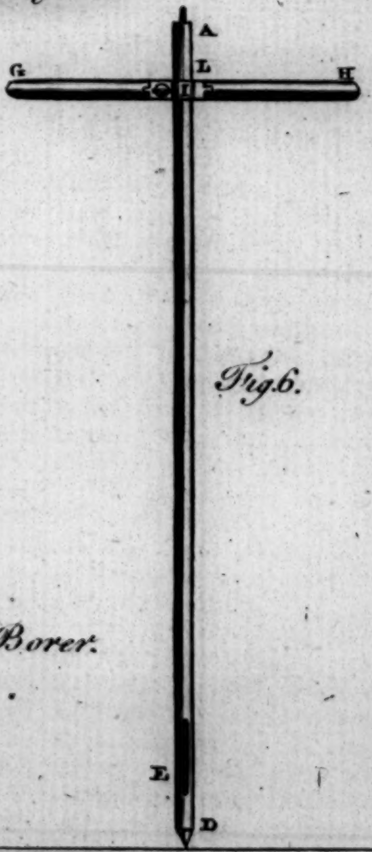


Fig. 6.

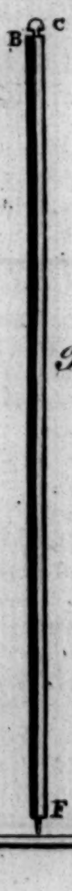


Fig. 7.

Borer.

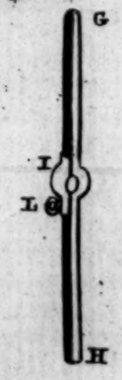


Fig. 8.

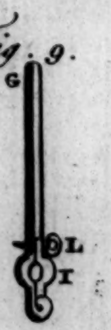


Fig. 9.

J. Hulett Sculp.

G.R. III
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and a falling down, without ſenſe or motion. Inſtances of this kind are not uncommon, eſpecially in very hot weather, when the external heat adds greatly to the blood's motion and rarefaction. But as we ſuppoſe, in this caſe, little or no fault in the blood, except, perhaps, a plethora, or weakneſs of the veſſels, the quickeſt and readieſt remedy is bleeding; and unleſs the horſe dies with the violence of the fall, which ſometimes happens, or by burſting the ſmall veſſels of the brain or lungs, or happens through polipuſes in the heart or principal veins, he will ſoon riſe of himſelf, or without much help, and may be preſerved from ſuch accidents for the future, by better uſage. *Gibſon on the Diſeaſes of Horſes.*

APPETITE, a certain painful or uneaſy ſenſation, always accompanied with a deſire to eat or drink.

Horſes, more than moſt other creatures, are ſubject to diſeaſes of the ſtomach, particularly to *a want of appetite*, and a *vitiated*, or *voracious appetite*.

Want of APPETITE is when a horſe feeds poorly, and is apt to mangle his hay, or leave it in the rack, and at the ſame time gathers little fleſh, and his dung habitually ſoft, and of a pale colour.

Theſe are evident ſigns of a relaxed conſtitution, wherein the weakneſs of the ſtomach and guts may have a very great ſhare. This habitual weakneſs may be either natural and hereditary, or may be cauſed by ſome previous ill management; ſuch as too much ſcalded bran, or too much hot meat of any kind, which relaxes the tone of the ſtomach or guts, and in the end produces a weak digeſtion, and conſequently a loſs of appetite.

The beſt method to harden and recover ſuch horſes, is to give them gentle exerciſe in the open air, eſpecially in dry weather; never to load their ſtomachs with large feeds, and to keep them as much as poſſible to a dry diet, indulging them now and then with a handful of beans among their oats; but in caſe the horſe grows weak, and requires the help of phyſic, a few laxative purges like the following ſhould be given:

"Take ſoccotrine aloes, ſix drams; rhubarb in fine powder, two drams; ſaffron dried and powdered, one dram: make it into a ſtiff ball, with a ſufficient quantity of ſyrup of roſes, and add two drams of the elixir proprietatis, prepared with oil of ſulphur by the bell."

This purge will work very gently, and bring the horſe to a better appetite, and ſtrengthen his digeſtion. It may be repeated once a week, or once in ten days: and, after the operation of each purge,

"Take a large handful of the raſpings or ſhavings of guaiacum, pomegranate bark, and balauſtines bruiſed, of each an ounce; galangals and liquorice root ſliced, of each half an ounce: let theſe be boiled in ſix quarts of ſmiths' forge-water, to three pints; and while it is warm, infuſe in the decoction two drams of ſaffron, and half an ounce of diaſcordium."

Let this be divided into two drinks, and give one after the purge has done working, and the other after two days intermiſſion; in cold weather the drinks ſhould be warmed before they are adminiſtered: the ſame may be complied with after the laſt purge, and repeated as often as may be neceſſary, continuing to give the horſe conſtant exerciſe in the open free air; and this will be the likelieſt method to ſtrengthen ſuch horſes as are of weak relaxed conſtitutions.

But where ſuch a habit is contracted by too much feeding, eſpecially on hot ſcalded diet, which is often the caſe of young horſes kept up for ſale, the beſt way is to bleed and purge ſuch horſes, and at the ſame time to rowel them in the belly; for this ſort of feeding eaſily occaſions horſes to be lax, that have no natural diſpoſition to it; for when they grow ſuddenly fat by ſuch management, the ſecretions from the guts become greaſy, which always cauſes weakneſs and relaxation in them, and often forms a proper nidus for the breeding of vermin; all which may be eaſily remedied by purging in the firſt place, and afterwards by proper exerciſe, and a clean diet.

As for thoſe horſes that are of a hot fiery diſpoſition, and loſe their appetites by their heat and fretting, it is a caſe that cannot eaſily be remedied, becauſe of the natural inflammatory diſpoſition of their blood; the only method is to keep them to a cool diet while they are young, and, in country places, to let them run abroad, eſpecially where they have ſtables and warm ranges, to keep them from the inclemency of the weather in winter; for theſe ſort of horſes are always tender, being, for the moſt part, extremely thin ſkinned, and their blood of a thin texture, and eaſily put in motion. For the ſame reaſon, the beſt way, in ſummer, is to bring them up in the day time, and only let them run abroad in the night, they being more hunted with the flies than any other, which keeps them continually upon the fret, and hinders them from thriving. When ſuch horſes live till they are full aged, their heat and fierineſs often abates, ſo that they grow more uſeful; but while they are young, they are more ſubject to inward impoſthumations than horſes of a cooler temperament; and theſe often kill them ſuddenly, or bring them into lingering conſumptive maladies, which in ſome meaſure may be prevented by the above method. *Gibſon on the Diſeaſes of Horſes.*

Vitiated, or *Voracious* APPETITE, is that where the animal is always craving for meat. *See* FOUL-FEEDING.

APPLES. Nature has furniſhed us with only one ſort of this ſpecies of fruit, viz. the crab, common in woods and hedges. Linnæus, who knew all nature, takes no notice of the apple, as he conſidered it as no other than cultivated varieties of the pyrus malus, or crab; but we require not the aſſiſtance of botanic knowledge to convince us, that the numerous ſorts of fruit, which are cultivated by orchardmen and gardeners, are not natural ſpecies. Nature propagates and continues its own ſpecies by ſeed. But the ſeeds of a given ſpecies, or rather variety of apples, will not produce apples of the ſame kind, but a number of different kinds, moſt of them, probably, reſembling the wood-crab, rather than the apple which produced them, let its richneſs and flavour be what they may. Indeed repeatedly ſowing the ſeeds of the ſeedling in common ſoil, the common crab would, no doubt, be produced.

The fact ſeems to be, that fruit is not naturally a permanent ſpecific character; even the native wild crab is ſubject to infinite variety in colour, ſhape, and flavour; but by art the qualities of fruit may be identically preſerved.

The buſineſs, therefore, of the improvers of fruit is to catch at ſuperior accidental varieties, and having raiſed them by cultivation, to the higheſt degree of perfection they are capable of, to preſerve them in that ſtate by artificial propagation.

The law of Nature, however, though it ſuffers man to improve the fruits which are given us, appears to have ſet bounds to his art; and to have numbered the years of *his* creations. Artificial propagation cannot preſerve the varieties in perpetuity. A time arrives, when they can be no longer propagated with ſucceſs. All the old fruits, which raiſed the fame of the liquors of this country, are now loſt; or are ſo far on the decline, as to be deemed irrecoverable.

The redſtreak is given up; the celebrated ſtire apple is going off; and the ſquaſh pear, which has probably furniſhed this country with more champaign than was ever imported into it, can no longer be got to flouriſh: the ſtocks canker and are unproductive. In Yorkſhire, ſimilar circumſtances have taken place: ſeveral old fruits, which were productive within recollection, are loſt: the ſtocks cankered and the trees would no longer come to bear.

The duration of varieties may, however, depend much upon management. For although Nature wills that the ſame wood, or the ſame ſet of ſap-veſſels (for the wood which is produced by grafting is, in reality, no more than a protruſion of the graft,—an extenſion of the original ſtock) ſhall, in time, loſe its fecundity; yet, it is probable, that the ſame art which eſtabliſhes a variety, may ſhorten or prolong its duration. Much may depend upon the ſtock, and much upon the health of the tree, and the age of the wood, from which the graft is taken. Or, perhaps, the canker (which ſeems to be the natural deſtroyer of varieties) may be checked. But of theſe in their places.

The popular idea among orchardmen is, that the decline of the old fruits is owing to a want of freſh grafts from abroad—from "Normandy"—under a notion, that the higheſt-flavoured apples grow there, in a ſtate of Nature, as the crab in this iſland.

That the firſt fruits of our anceſtors were fetched from the continent is highly probable. But it is equally probable, that the ſorts which were originally imported, have long ago been loſt; and that the numerous varieties, we are at preſent poſſeſſed of, were raiſed from the ſeed, in this country. Miller, whoſe extenſive practice and connexions enabled him to be an adequate judge of this ſubject, ſpeaks of them as ſuch. After enumerating ſome French apples, he ſays,—"the ſorts, which are above-mentioned, are what have been introduced from France; but there are not above two or three of them which are much eſteemed in England; viz. the French rennette, the rennette-griſe, and the violet apple; the other being early fruit, which do not keep long and their fleſh is generally meally, ſo that they do not deſerve to be propagated; as we have many better fruits in England, which I ſhall next mention:" and in mentioning the golden pippin, one of the firſt apples we know, either for the table or the cider preſs, he ſays " the golden pippin is a fruit peculiar to England. There are few countries abroad where this ſucceeds well."

The ſtire apple is generally underſtood to be a "kernel fruit:" and the Hagloe crab, whoſe fame as a cider fruit is little inferior to that of the ſtire, is ſtill traceable to the parent ſtock. The original tree is ſtill in being.

It is probable, however, that many of our preſent fruits have not been produced from our own native crab; but from the apples which were originally imported. Nevertheleſs, it is more than probable, that ſome of the higher-flavoured, firmer fruits, as the golden pippin, have been raiſed, by cultivation, from the native ſpecies. The proceſs is ſimple and eaſy: and a young man of ingenuity and enterpriſe, and in a proper ſituation, might be leſs rationally employed, than in improving this ſpecies of his country's produce.

Elect, among the native ſpecies, individuals of the higheſt flavour. Sow the ſeeds in a highly enriched ſeed-bed, in the manner which will be deſcribed. Select, from among the ſeedlings, the plants whoſe wood and leaves wear the moſt apple-like appearance. Tranſplant theſe, into a rich deep ſoil, in a genial ſituation, and at diſtances which will be mentioned; letting them remain in this nurſery until they begin to bear.

With the ſeeds of the faireſt, richeſt, and beſt-flavoured fruit, repeat this proceſs. And, at the ſame time, or in due ſeaſon, engraft the wood which produced this fruit, on that of the richeſt, ſweeteſt, beſt-flavoured apple: repeating this operation; and tranſferring the ſubject, under improvement, from one tree and ſort to another, as richneſs, flavour, or firmneſs may require. Continuing this double mode of improvement, until the deſired fruit be obtained.

There has, no doubt, been a period, when the improvement of the apple and the pear was attended to in this country. And ſhould not the ſame ſpirit of improvement revive, it is probable, that the country will, in a courſe of years, be left deſtitute of the valuable kinds of theſe two ſpecies of fruit: which, though they may in ſome degree be deemed objects of luxury, long cuſtom ſeems to have ranked among the neceſſaries of life.

Having thus endeavoured to convey a general idea of the nature and propagation of varieties, it will be proper to enumerate ſome of the moſt celebrated of thoſe which are now in cultivation, in theſe counties:—to deſcribe, or ven enumerate, all the preſent varieties of orchard fruit would be impoſſible. They are without number. In Herefordſhire, more particularly, a very conſiderabe proportion of the fruit which is grown is "kernel fruit;" produced from trees that have been raiſed from the ſeed; and which have never been grafted. Conſequently each tree is a ſeparate variety; bearing the name, perhaps, of its planter, or of the "ground" it grows in.

There are, nevertheleſs, numbers which are univerſally known; and ſome of them ſufficiently celebrated to be entitled to notice.

Of apples, the ſtire ſtands firſt in eſtimation. The fruit of this variety is ſomewhat below the middle ſize. The form rather flat. The colour a pale yellowiſh white, with ſometimes a faint bluſh on one ſide. The fleſh tolerably firm. The flavour, when fully ripe, fine. It is deemed, by moſt people, a tolerably good eating apple. The cider, which is produced from it, in a ſoil that is adapted to it, is rich, highly flavoured, and of a good body:—its price frequently fourfold that of common ſale cider. The thin limeſtone ſoils on the margin of the foreſt of Dean, are ſaid to produce the richeſt ſtire cider. The tree which bears this apple is of a ſingular growth:—remarkably "beeſom headed:"—throwing out numerous, ſtraight, luxuriant, upward ſhoots, from the crown; taking the form of a willow pollard; running much to wood; and, in deep ſoils, growing to a great ſize before it become fruitful.

There is an apple called the red ſtire; but it has no peculiar affinity with the true ſtire. In Herefordſhire, about Marcle, I met with a "yellow ſtire"—and on the foreſt there is the "kernel ſtire:"—both of them probably kernel fruits, which, bearing ſome likeneſs of the true ſtire, have had its name improperly given them.

The Hagloe crab is, at preſent, next in eſteem. It has already been mentioned, that this variety is traceable to the original ſeedling. It was produced, about ſeventy years ago, in a nurſery among other ſtocks raiſed from the ſeed, by Mr. Bellamy of Hagloe, in Glouceſterſhire, grandfather of the preſent Mr. Bellamy, near Roſs in Herefordſhire; who draws from it (that is, from trees grafted with ſcions from this parent ſtock) a liquor, which, for richneſs, flavour, and price on the ſpot, exceeds, perhaps, every other fruit liquor, which nature and art have produced. He has been offered ſixty guineas for a hogſhead (about 110 gallons) of this liquor. He has likewiſe been offered bottle for bottle of wine or ſpirituous liquors, the beſt to be produced; and this without freight, duty, or even a mile of carriage to enhance its original price.

This fruit, while growing, is nearly white; when fully ripe it has a yellowiſh caſt; ſometimes freckled with red on one ſide, like the common white crab. The ſize about that of the ſtire apple; but the form more oblong. The fleſh remarkably ſoft and woolly, but not dry; being furniſhed with a ſheer, but, when fully ripe, ſweet juice; which, however, is much ſmaller in proportion to the quantity of fibrous matter, than that of moſt other apples. The flavour, when ripe, reſembles that of the caſhew apple of the Weſt-Indies; and, what is remarkable, the texture of the fleſh is not unſimilar to the pulp of that fruit. The cider, notwithſtanding the ſheerneſs of the juice, is, when properly manufactured, ſingularly rich; and notwithſtanding the faint ſmell of the apple, is highly flavoured: and, what is equally remarkable, the liquor is of the higheſt colour, notwithſtanding the paleneſs of the fruit.

The golden pippin is in high eſtimation as a cider apple; and may rank as the third of this diſtrict. It is more generally known than the Hagloe crab, and, at public market, its liquor, I believe, is generally next in price to that of the ſtire apple.

The old red-ſtreak is yet in being. A few old trees are ſtill remaining. The fruit ſmall, roundiſh, of a pale yellow ground, with numerous faint red-ſtreaks. The fleſh firm, full of juice, and, when ripe, finely flavoured; a palatable eating apple. The cider, at preſent, is not, I believe, in particular eſtimation: little if any genuine redſtreak cider is now made. It never was, I believe, equal to that of either of the preceding apples. The tree of this apple is of a ſingularly awkward growth; Crooked, reclining, ragged and unſightly.

The woodcock is another favourite old cider fruit. But is now going off: many old trees, however, are ſtill left in the diſtrict. The fruit is much larger than any of the preceding ſorts: above the middle ſize. The form ſomewhat oblong; with a long ſtalk, ſet on in a peculiar manner; feigned to reſemble the woodcock's beak (hence the name). The colour that of the redſtreak, with the addition of ſome dark blood-red ſtreaks on one ſide. The fleſh remarkably fine; equally fit for culinary purpoſes and for cider. The tree large and ſtrongly featured; forming large boughs in the pear-tree manner.

Other favourite cider apples, at preſent, are:

The muſt:—an old favourite fruit, of which three ſorts are enumerated.

The pauſon:—a middle-ſized, green apple.

The royal wilding:—a large white apple.

The dymmock red:—middle-ſized, red.

The coccagee: above the middle ſize: greeniſh white, with an orange bluſh:—well fleſhed, and highly flavoured.

Ruſſets, of various kinds, are in good eſteem: particularly the Longney ruſſet.

Bromley, foxwhelp, red crab, queening,—all of them large red apples,—are in good eſtimation for cider. *Marſhall's Rural Economy of Glouceſterſhire.*

Mr. Young in his Annals of Agriculture, vol. vii. has a letter from Mr. Gullet of Exeter, which recommends the following method to effectually deſtroy the inſect that prevents the bloſſoms of apples and other fruit trees from producing fruit. Theſe inſects are depoſited in their egg-ſtate by a fly, in the bud of the apple, or bloſſom, at its firſt opening, and they ſoon become a maggot, which exhauſt the nouriſhment of the bloſſom, which with the ſlighteſt touch will fall off. It is ſtrongly recommended to ſet fire to ſome heaps of wet ſtraw, weeds, or any other like matter on the windward ſide of the garden or orchard, viz. if the wind is eaſt, let the fumigation be from that point, ſo that the ſmoak from the heaps may blow through the tree for ſome days. The expence attending will be very trifling, conſidering the beneficial effects of it, as it will not only deſtroy the inſects for the preſent, but prevent them from depoſiting their eggs. The heat and aſhes will likewiſe contribute to the fertility of the ſoil, the ſweetneſs of the paſture, and the growth and vigour of the trees for future bearings.

APRIL, the fourth month of the civil year, conſiſting of thirty days.

This month is the beſt month, if the weather be dry, to ſow barley and white oats, to deſtroy weeds, and alſo to fallow land.

Fell the timber you intend to bark, if the ſpring be forward: cleanſe and rid your coppices, and preſerve them from cattle: keep geeſe and ſwine out of commons and paſtures, and water new planted trees, if the weather prove dry.

Pick up ſtones on the new ſown land: ſow hemp and flax.

Cleanſe ditches, and get in your manure that lies in the ſtreets or lanes, or lay it in heaps.

Set oſiers, willows, and other aquatics, before they are too forward, and alſo ſlips of roſemary or lavender.

You may throughout this month ſow clover graſs, ſaintfoin, and all French and other graſſes, or hays: plant madder, and be ſelling your winter-fed cattle. *Mortimer's Huſbandry.*

AQUATICS, or *aquatic* plants, ſuch plants and trees as grow in water.

Thus, the willow, oſier, water-creſſes, brook-limes, &c. are aquatics.

Mr. Marſhall, in his Rural Economy of the Midland Counties, ſays, that he dreſſed lands with the aquatic manure, (raiſed two or three years before, out of a fiſh-pool, and afterwards turned up into a heap of digeſts), the reſt of the piece being manured with yard dung; the quantity of each about eight loads an acre. The two lands dreſſed with the aquatic manure, were obviouſly the better crop of turnips. The plants were not more numerous, but they were larger and cleaner-ſkinned; and what is remarkable, while the crop of the piece in general was full of catlock and chickweed, (which aroſe ſince the hoeing) the two lands were, in a manner, entirely free from thoſe weeds.

ARABLE *land*, ſuch land as is tilled, or cultivated for the production of corn.

ARAIRE, the name of a ſmall plough uſed in Provence and Languedoc, in France.

It conſiſts of a ground wriſt, *a*, *b*, (Plate I. fig. 3.) from three to four feet long, ending in a point towards *b*. The under part of this wriſt, inſtead of being flat, is formed into a ridge, which extends the whole length of it.

This ground wriſt, at the end *a*, terminates in a ſtrong tenon fixed in a large mortiſe, formed at the extremity *d* of the beam *d e*, and is beſides faſtened to the beam by two iron uprights *f g*, which have a head at *g*, and going through the beam are keyed at *f*: the diſtance between the under part of the beam about *f*, and the upper part of the ground wriſt towards *g*, is about fifteen inches. Inſtead of theſe uprights there is ſometimes put a piece of ſharpened wood or iron, as repreſented by the pricked line *h g*, which ſerves inſtead of a coulter.

On the upper part of the ground wriſt is fixed a large iron ſhare *d h* (fig. 4.) the part *d i*, is received into the ſame mortiſe of the extremity *d* (fig. 3.) in which the tenon of the ground wriſt is faſtened; and the wings of the ſhare *k l* (fig. 4.) reſt upon the iron uprights *f g* (fig. 3.)

On the hindermoſt part of this plough is a ſingle lever *m d* (fig. 3.) which ſerves for a handle: at the end *d*, where it is bent, it enters, as well as the ground wriſt and ſhare, into the great mortiſe *d*, at the end of the beam; and the whole is ſecured with wedges. The handle ſometimes conſiſts of two pieces lapped one over the other, as at *n*, to lengthen or ſhorten it, according to the height of the ploughman.

By means of the wedges juſt mentioned, the angle which the ground wriſt forms with the beam, may be altered at pleaſure, which makes it plough more or leſs deep. At the hinder parts of the ground wriſts are two earth boards, faſtened at *o*, by a ſtrong wooden pin, which paſſes through both the boards and the ground wriſt.

The beam *d*, *f*, *e*, which from eight to ten feet long, has an iron bolt at the end *e*, which enters with great eaſe into a large mortiſe made at the extremity *g*, of the piece of wood *q 5 r*, intended to paſs between the oxen, and to which their harneſs is to be faſtened. When a ſingle horſe is uſed in the plough, a ſhaft is ſubſtituted inſtead of the piece of wood *q 5 r*, and faſtened to the end of the beam *e*, by an iron ringlet.

It is evident that this plough goes a greater or leſs depth, according as the draught is more or leſs raiſed. The ploughman, as has been already obſerved, can alter the angle which the ground wriſt forms with the beam, by means of the wedges he drives into the mortiſe of the beam, which receives both the ground wriſt and handle. But theſe directions not being ſufficiently exact, it is neceſſary that the ploughman ſhould lean on the handle *m*, when it cuts too deep, and raiſe it when it makes too ſhallow a furrow: this labour is ſo conſtant, that were the plough to work in a ſtrong ſoil, the ploughman could not ſupport it. The two little earth boards *p p*, turn over to the right and left the earth that has been looſened by the ſhare; but this is not done ſo regularly as when there is but one earth-board, which throws the earth into the furrows before made, as faſt as it comes out of that which the plough is forming: it is however certain, that the ground wriſt being ridged, the ploughman always reſts it on one ſide, which occaſions the greater part of the earth to be thrown one way.

Theſe ploughs having no coulters, the earth is not cut vertically at all: for neither the piece of ſharpened wood, nor the ſheath which joins the ground wriſt to the beam, and which is placed a little before the ſmall iron bars *f*, *g*, can be eſteemed a coulter. The bar repreſented by the pricked line *h g*, may ſerve inſtead of a coulter, but it muſt then be made of iron; and in this caſe the coulter would be very improperly ſituated, for it ſhould by rights be before the ſhare.

Theſe ploughs are very convenient to uſe among trees, or in vineyards; they may alſo ſerve to ſtir the ground in the intervals between the rows of ſaint-foin and lucerne; but then ſhould be rather called cultivators, than ploughs. *Du Hamel's Elemens d'Agriculture.*

ARCHIMEDES's *ſcrew*, a kind of ſpiral pump, for raiſing water, ſo called from Archimedes, its inventor.

It conſiſts of a long cylinder, with a hollow pipe, tube, or groove coiled round, as repreſented on Plate I. fig. 5. where A B ſhews the cylinder, and C D the tube open at each end. It is placed in an oblique poſition to the horizon, with the lower end in the water to be raiſed, and the other ſupported by the pivot below the winch J K, by which the tube and cylinder are turned round.

As ſoon as the ſcrew is immerſed in the water, it immediately riſes therein by the orifice C, to the level of the ſurface of the water E F; and if the point of the ſpiral tube, which in the beginning of the motion is coincident with the ſurface of the water, happens not to be on the lower ſide of the cylinder, the water will, upon the motion of the ſcrew, move on the ſpiral tube, till it comes to the point which is on the other ſide, and coincident with the ſurface of the water; when it is arrived at that point, as ſuppoſe at O, it cannot afterwards poſſeſs any part of the ſpiral, but that which is upon the loweſt part of the cylinder; for it cannot move from O towards H or G, becauſe they are ſituated higher above the horizon; and ſince this will conſtantly be the caſe, after the water in the ſpiral has obtained the point O, it is plain that it muſt always be on the under part of the cylinder.

But becauſe the cylinder is in motion, every part of the ſpiral ſcrew from O to D, will by degrees ſucceed to every part thereof from O to D, as it comes on the lower ſide; that is, it muſt aſcend on the lower part of the cylinder through all the length of the pipe, till it comes to the orifice at D, where it will run out, as having nothing farther to ſupport it.

This engine may be very uſeful in raiſing water, foul with ſand, &c. as the leathers of pumps will be ſoon deſtroyed by theſe particles. And it was principally this reaſon that induced the ingenious Mr. Smeaton to erect a machine of this kind in the gardens of her royal highneſs the princeſs dowager of Wales, at Kew, where it is worked by horſes, and ſupplies all the ponds, &c. in that extenſive garden with water. A machine of this kind, turned by a windmill, might be of great uſe in draining lands in ſeveral parts of England, as it is not ſubject to be out of order, and might be made to raiſe a very large quantity of water to a ſmall height. We ſhall deſcribe ſeveral other contrivances for this purpoſe when we come to treat of draining of lands, there being many very curious and uſeful engines of this kind depoſited in the machine room of the ſociety for the encouragement of arts, &c. *See the article* DRAINING *of* LANDS.

ARCHIMEDES's *ſcrew*, is an engine of great uſe, for raiſing water a few feet high. The beſt way of making it is, not with a hollow pipe coiled round the ſhaft or axis, which would be liable to many accidents, but by cutting a ſpiral groove about an inch deep, and the ſame wide, round the axis, and extending near the whole length of it. Narrow boards of oak are fitted to the groove, and made to join very cloſe to each other ſideways. They are then ſawed off very even, and to the ſame height above the ſhaft, and narrow deal boards, cloſe jointed, nailed upon the tops of the oaken boards, forming a hollow cylinder, which is bound with iron hoops. One end of this cylinder being dipped in the water, the other end is raiſed the intended height, and by turning the cylinder or barrel round, the water is raiſed, as before explained. If the barrel was raiſed perpendicular, the engine would have no effect, for no water would be raiſed. In general, the higher the upper end of the engine is raiſed, it diſcharges the leſs water, and is the eaſier worked: the beſt poſition is to place it obliquely, ſo that the barrel makes an angle about 45 degrees from the perpendicular.

Sometimes this engine is made with only a ſingle ſpiral partition or thread; and ſometimes with a double one, which is found to raiſe more water than the ſingle: but when there are three ſuch parallel threads in the barrel, it does not raiſe ſo much water as with two.

This engine is liable to few accidents, and if well conſtructed, pitched within and without, and kept in a houſe, or under a dry ſhed when not in uſe, will laſt a long time, with very little repairing.

The barrel may be made a little wider at the upper end than at the lower, that goes in the water, which anſwers two purpoſes; one is, that if the water is foul, the mud, ſand, and gravel, is not apt to ſtick by the way in riſing, as it might do, if the barrel was a cylinder, equal in diameter throughout its whole length. And by making the barrel a little conical, the iron hoops take the better hold, and draw the joints of the covering boards the cloſer. Theſe boards may be of deal, for lightneſs.

The quantity of water that a ſcrew engine will raiſe, depends upon various circumſtances, the number of threads in the barrel, its ſize, elevation, &c. In general, if an engine of two threads, is 18 feet long in the barrel, is elevated to an angle of 45 degrees, it will throw out all the water that ſprings up in a ſurface of from two to three thouſand ſquare feet; and will keep a pond, or bottom of a lock or ſluice, dry enough for men to ſtand in and repair it: this, however, is to be underſtood, where the bottom and ſides of the pond is of a pretty cloſe ſoil: for if the ſoil is very ſandy, gravelly, and porous, the water will force through ſuch a ſoil too faſt, for one ſuch engine to keep the pond dry; the 18 feet long is the largeſt ſcrew engine commonly made.

The engines of this ſize are worked with horſes, proper wheel-work being fixed to the upper end of the ſhaft for that purpoſe. Twelve horſes are neceſſary to turn it, four each time; and ſometimes ſixteen horſes are neceſſary. There are frequently ſmaller ſcrew engines made, to be turned by men, with a crank or bent handle, at which four or five men can work at once, and the men changed every four hours: theſe anſwer very well where the water to be raiſed is in ſmaller quantity. Theſe engines raiſe the water about four, five, and ſometimes ſix feet high, and throw it over a bank or wall.

ARDERS, fallowings, or plowings of land.

AROMATIC, an epithet applied to ſuch plants, and other bodies, as yield a fine fragrant ſmell, and have a warm ſpicy taſte.

ARPENT, the French name for an acre. *See* ACRE.

We have already obſerved, under the article *acre*, that the French arpent contains 100 perches of twenty-two French ſquare feet, which is equal to about one acre and three quarters of a rood Engliſh meaſure. But it may be neceſſary to add here, that the French have three different arpents, diſtinguiſhed by the epithets *little*, *middle*, and *great* arpent.

The *little* ARPENT contains 100 perches of eighteen feet and a half ſquare; conſequently its ſuperficial meaſure is 32,400 French feet, equal to 34,603 feet, or three roods, ſeven perches, and twenty-ſeven feet Engliſh meaſure.

The *middle* ARPENT conſiſts alſo of 100 perches, twenty feet ſquare, which makes 40,000 French feet ſuperficial meaſure; equal to 42,720 feet, or three rood, thirty-ſix perches, and 149 feet Engliſh meaſure.

The great ARPENT, contains ten perches of twenty-two ſquare perches. *See the article* ACRE.

ARTIFICIAL GRASSES, ſuch as are introduced into the field with great care, and cultivated afterwards with much diligence. Such as burnet, clover, lucern, ſaintfoin, ray-graſs, ſpurry, &c. *See the method of cultivating each under its proper article.*

ARTIFICIAL PASTURE, ſuch lands as are properly cultivated and ſown with the above plants, or any other that yield a great deal of fodder for cattle.

ARTIFICIAL PONDS. *See* PONDS.

ASCARIDES, ſmall worms common in horſes, reſembling needles, ſome of them white, and ſome of an azure colour, with flattiſh heads. They are often called needle-worms by the farriers.

Theſe worms are very troubleſome, and hard to be rooted out, and expoſe horſes to frequent gripes, and other fretting uneaſy diſorders in the guts. They breed at all times of the year, and often when one brood is deſtroyed, another ſucceeds. They are not mortal; but when a horſe is peſtered with this ſort of vermin, though he will go through his buſineſs tolerably well, and ſometimes feed heartily, yet he always looks lean and jaded; his hair ſtares as if he was ſurfeited, and nothing he eats makes him thrive; he often ſtrikes his hind-feet againſt his belly, which ſhews where his grievance lies, and is ſometimes griped, but without the violent ſymptoms that attend a cholic or ſtrangary; for he never rolls or tumbles, but only ſhews uneaſineſs, and generally lays himſelf down quietly on his belly for a little while, and then gets up and falls a feeding; but the ſureſt ſign is when he voids them with his dung.

Theſe ſmall worms ſometimes come away in great numbers with a purge, and ſome horſes get clear of them by purges only; but this does not often happen; for the horſes that breed aſcarides are above all others, ſubject to ſlime and wormy matter. They ſeem to have their lodgment about the beginning of the ſmall guts, near the ſtomach, among the concocted aliment or chyle, both from their colour, the ſymptoms of the gripes, and the ſudden fits of ſickneſs theſe horſes are often ſeized with, which ſometimes make them abruptly leave off their food, for a few minutes, and fall greedily to it again as ſoon as the ſick fit is over. They are ſeldom ſeen, except when a horſe has had a purge given, or when he falls into a natural purging, which thoſe horſes are often ſubject to, and then they come away in very great numbers, with much ſlime and naſtineſs. They not only make a horſe grow lean, and look ſurfeited, but in opening his mouth, one may perceive a more than ordinary languid whiteneſs, and a ſickly ſmell, from the want of thoſe due ſupplies of blood and nouriſhment, which give a livelineſs to the colour that is always perceivable in ſound vigorous horſes; ſo that whatever be the primary cauſe, theſe worms ſeem, in a great meaſure, to proceed from a vitiated appetite, and a weak digeſtion, which renders them the more difficult to be removed; for which reaſon recourſe muſt be firſt had to mercurials, and after theſe, to ſuch things as are proper to ſtrengthen the ſtomach, promote digeſtion, and give a better tone to the ſolids.

To a horſe, therefore, that is troubled with theſe ſmall, white, or azure coloured worms, the following method may be obſerved:

"Take of calomel that has been often ſublimed and well prepared, two drams; diapente half an ounce; make it into a ball, with a ſufficient quantity of conſerve of wormwood, or of rue, and give it in the morning, keeping the horſe from meat and water four hours before, and four hours after taking it."

The next morning adminiſter the following purge, taking great care to keep the horſe from wet, or from any thing that may expoſe him to catch cold:

"Take Barbadoes, or plantation alloes, one ounce; ſalt of tartar, two drams; freſh ginger grated, a dram and a half; oil of amber a middling ſpoonful: make the whole into a ball with flour or liquorice powder."

This purge may be worked off in the ſtable with warm water, which is much the ſafeſt way when mercurials are given. The calomel ball and purge may be repeated in ſix or eight days; and again in ſix or eight days more.

When a horſe has gone through a courſe of theſe mercurial purges, let the following drink be given two or three times a week, and continued till the horſe begins to thrive and look healthful:

"Take rue, camomile flowers, and horehound, of each a handful;

a handful; galangals, bruiſed in a mortar, three drams; liquorice root, ſliced, two drams: boil it in a quart or three pints of forge-water five or ſix minutes, in a covered veſſel, and keep it covered till cold: then ſtrain it through a piece of coarſe canvas, and give it in the morning upon an empty ſtomach." *Gibſon on the Diſeaſes of Horſes.*

ASH, *or* ASH-TREE. There are ſeveral ſpecies of the aſh-tree cultivated by curious perſons for the ſake of variety; but what deſerves attention in a work of this kind, is the common aſh, called by botaniſts *fraxinus foliolis ſerratis, floribus apetalis*; and is ſo well known as to need no deſcription.

This tree propagates itſelf in plenty by the ſeeds which ſcatter in the autumn; ſo that when the ſeeds happen to fall in places where cattle do not come, there will be plenty of plants come up in the ſpring; but when any perſon is deſirous of raiſing a quantity of the trees, the ſeeds ſhould be ſown as ſoon as they are ripe, and then the plants will come up in the following ſpring; but if the ſeeds are kept out of the ground till ſpring, the plants will not come up till the year after; the ground therefore ſhould be kept clean all the ſummer where they are ſown and not diſturbed, leſt the ſeeds ſhould be turned out of the ground, or buried too deep to grow.

When the plants are come up, they muſt be kept clean from weeds during the ſummer; and, if they make good progreſs in the ſeed-bed, they will be fit to tranſplant by the following autumn; ſome ground ſhould, therefore, be prepared to receive them; and as ſoon as their leaves begin to fall, they ſhould be tranſplanted. In taking of them up, care ſhould be taken not to break or tear off their roots; to prevent which they ſhould be taken up with a ſpade, and not drawn up, as is frequently practiſed; for as many of the plants which riſe firſt from ſeeds will out-ſtrip the others in their growth, ſo it is frequently practiſed, to draw up the largeſt plants, and leave the former to grow a year longer, before they are tranſplanted: and to avoid hurting thoſe that are left, the others are drawn out by hand, and thereby many of their roots are torn off, or broken. It is, therefore, much the better way to take all up, little or big, together, and tranſplant them out, placing the large ones together in rows, and the ſmall ones by themſelves. The rows ſhould be three feet aſunder, and the plants a foot and a half diſtance in the rows. In this nurſery they ſhould remain two years, by which time they will be ſtrong enough to plant where they are to remain, for the younger they are planted out the larger they will grow; ſo that where they are deſigned for uſe, they ſhould be planted very young; nor ſhould the ground where they are raiſed be better than that where they are deſigned to grow. For when plants are raiſed in good land, and afterwards planted into worſe, they very rarely thrive; ſo that it is much the better method to make the nurſery upon a part of the ſame land, where the trees are deſigned to be planted, and then a ſufficient number of the trees may be left ſtanding upon the ground, and theſe will outſtrip thoſe which are removed, and grow to a larger ſize.

Where people live in the neighbourhood of aſh-trees, they may ſupply themſelves with plenty of ſelf-ſown plants, provided cattle are not ſuffered to graze on the land; for if cattle can come at them, they will eat off the young plants, and not ſuffer them to grow; but where the ſeeds fall in hedges, and are protected by buſhes, the plants will come up and thrive: in theſe hedges the trees are frequently permitted to grow till they have deſtroyed the hedge, for there is ſcarce any tree ſo hurtful to all kinds of vegetables as the aſh, which robs every plant of its nouriſhment within the reach of its roots, and ſhould therefore never be ſuffered to grow in hedge-rows; for they not only kill the hedge, but impoveriſh corn, or whatever is ſown near them. Nor ſhould any aſh-trees be permitted to grow near paſture grounds, for if any of the cows eat of the leaves or ſhoots of the aſh, all the butter that is made of their milk will be rank, and of little or no value. In all good dairy countries therefore they never ſuffer any aſh-trees to grow.

If the wood of theſe trees be rightly managed, it will turn greatly to the advantage of its owner; for by the underwood, which will be fit to cut every eight or ten years, there will be a continual income more than ſufficient to pay the rent of the ground, and all other charges; and ſtill there will be a ſtock preſerved for timber, which in a few years will be worth forty or fifty ſhillings per acre.

The aſh delights in a moiſt ſoil, and will thrive even in an undrained moory ſituation. Even thoſe with oſiers will vie with them. It is a thirſty plant. The ground under an aſh is obſerved to be always comparatively dry; and it is probably from this abſorbent nature, that it is ſo great an enemy to the herbaceous tribe. Turneps, a ſucculent plant, ſtarves under the aſh; and corn never thrives in its neighbourhood. Clover, however, ſeems to be an exception to this theory. It is nevertheleſs an undoubted fact, that the aſh is a deſtructive enemy on arable land; and it is highly improper to plant it in hedges. It ought to be planted in waſte nooks and corners; or, perhaps, for two reaſons, on improveable ſwamps, and on the ſpringy ſides of hills: it would be rendering them uſeful as ſites of plantations; and perhaps by its abſorbent nature would render them firm. If the tree gets diſbarked, though its appearance ſhould be flouriſhing on its being felled, the roots will be found decayed, and the ſtem at the bottom a compleat ſhell; and therefore ought not in point of profit to be ſuffered to ſtand. This tree, when it ſtands amongſt the firs and larches, if planted cloſe, will grow too tall and ſlender, but thrive well when planted alone. They are frequently known to have thrived for at leaſt ninety years, as may be obſerved by their rings. Of the firſt ten years as well of the laſt ten the growth has been ſlow. Intermediate years the different thickneſs of the rings in different years were ſtriking, as obſerved by Mr. Marſhall in his Rural Economy of the Midland Counties.

This timber is of excellent uſe to the wheel-wrights and cart-wrights for ploughs, axle-trees, fellies of wheels, dairy-utenſils, harrows, oars, blocks for pullies, and many other purpoſes.

The beſt ſeaſon for felling theſe trees is from November to February; for if it be done either too early in the autumn, or too early in the ſpring, the timber will be ſubject to be infeſted with worms, and other inſects: but for lopping of pollards the ſpring is preferable for all ſoft wood. *Miller's Gard. Dict.*

ASHES, the earthy particles of combuſtible ſubſtances remaining after they have been burnt.

Mr. Young, in his Annals of Agriculture, vol. I. by an experiment, approves of charcoal-aſhes in preference to powdered charcoal itſelf. By another experiment, wood-aſhes mixed with mud, he ſays, are ſuperior to aſhes alone, and four times better than mud alone, as a manure. In vol. II. he ſays wood-aſhes appear to be a moſt powerful manure. In a neighbourhood abounding with vitriolic acid, they more than neutralize that ſalt; they furniſh beſides the food of plants. In neutralizing it, the fixed vegetable alkali they contain forms with the acid a vitriolated tartar, which is beneficial.

If the aſhes are produced from vegetable bodies, they contain a conſiderable quantity of fixed ſalt, blended with the earthy particles; and from theſe particles the alkaline ſalts, called pot-aſh, pearl-aſh, &c. are extracted.

Aſhes of all ſorts contain in them a very rich fertile ſalt, and are the beſt manure of any to lay upon cold lands, eſpecially if kept dry, and the rain doth not waſh away their ſalts. One load of dry aſhes will go as far as two not kept ſo. But as rain-water diminiſhes their ſalts, ſo the moiſtening them with chamber-lie, or ſoap-ſuds, will add greatly to their ſtrength. Two loads of theſe aſhes will manure an acre of land better than ſix loads of thoſe that are expoſed to the rain, and that are not ordered ſo, which is the common allowance for an acre, though ſome lands require more, and ſome leſs. That the aſhes of any ſort of vegetables are very advantageous to land, is what is experienced in moſt places of England, by the improvement that is made by burning of fern, ſtubble, ſtraw, heath, furze, ſedge, bean-ſtalks, &c. *Mortimer's Huſbandry.*

Coal-ASHES, from their calcareous quality, are ſingularly beneficial to ſtiff and ſour land, for which purpoſe they are ſucceſsfully uſed in the neighbourhood of ſome great cities, where coal is burnt for fuel. They open clayey grounds, and correct their bad qualities. The gardeners and farmers about London know their value, and make a very profitable uſe of them, particularly to bring into order thoſe grounds which have been dug for brick-earth. After ſpreading theſe aſhes upon the clay bottom, they either ſow horſe-beans, or ſet the early Spaniſh, and ſometimes the Windſor-bean, in thoſe ſpots; or elſe they lay ſuch lands down with rye-graſs, which generally ſucceeds very well. Mr. Bradley blaming the people of Staffordſhire, and the counties adjoining, where there are coal-pits, for not improving their heavy grounds around thoſe pits, by manuring them with coal-aſhes, which might be eaſily burnt out of the waſte coals, ſays, “ that wherever there are plenty of coal-pits, there can be no want of good profitable land.” *Bradley's Huſbandry.*

Mr. Mortimer agrees entirely with Mr. Bradley, eſteeming ſea-coal aſhes as the beſt manure of any for cold lands, the moſt laſting, and the fitteſt to kill worms. Their ſharp and drying quality opens the pores of ſtiff ſoils, and diſcharges a great deal of their viſcous quality. Mr. Worlidge looks upon them as an excellent compoſt when mixed with horſe-dung; he adds, that they are a great curer of moſs and ruſhes in moſt grounds. *Worlidge's Huſbandry.*

Kiln-ASHES, made of ſtraw, furze, &c. are a good manure for almoſt any kind of ſoil. In the weſt of England, farmers ſift them over their corn and graſs; but this muſt not be done in windy weather, becauſe they are ſo very light that they would be eaſily blown away. They ſucceed beſt when laid on juſt before rain or ſnow. *Mill's Huſbandry, vol.* I.

Peat-ASHES are likewiſe a very good manure. Mr. Miller is of opinion, that they are greatly bettered by being mixed with lime before they are laid on the land.

Mr. Ellis has rightly obſerved, that there is a conſiderable difference between the aſhes of lean peat, and thoſe produced by the fatter kind. If barley, ſays he, be ſown ſo late as the beginning of May, lean peat-aſhes in particular may be applied over it, or harrowed in with the grain: but aſhes burnt from fat black peat, ſuch as is dug at Newbury, are of ſo ſulphureous a nature, that farmers are afraid to lay them on their barley; nor do they dreſs their wheat with them till the ſpring is advanced, and then they are ſown over it.

The earth of which this rich manure is made, is taken from a black mooriſh ground, with a narrow wood ſcoop, which brings it out like a long brick. Theſe pieces of ſwampy earth are laid on the ground to dry in the ſummer; after which they ſell for eight ſhillings a waggon load, for fuel. But when they are to be uſed for manure, after being dried, they are burnt in heaps of ten, twenty, or thirty loads, laying on more peat upon the outſides, as the fire increaſes within, to keep it from having too much vent.

The great uſe of theſe aſhes was diſcovered ſome years ago; but they ſoon fell into diſrepute, owing to the injudicious management of people, who imprudently laid on too great quantities of them at a time, by which means the corn was burnt. Afterwards they found that ſix, or at moſt ten buſhels, were ſufficient to be ſown over an acre of wheat, peaſe, turneps, clover, rape-ſeed, or ſaintfoin, as early as could conveniently be done. But ſtill many are afraid to ſow them over barley, leſt a dry ſeaſon ſhould enſue, and burn it up: for theſe aſhes are thought to contain three times as much ſulphur as there is in coal-aſhes. This is reaſonably ſuppoſed from their very ſtrong ſulphureous ſmell; their ſparkling and jumping when ſtirred while burning, and their drying up corn by their too great heat. Theſe peat-aſhes, as likewiſe thoſe of wood or coal, will help to keep off the ſlugs from peaſe and other grains, by the ſalt and ſulphur contained in them, and conduce very much to their preſervation in cold wet ſeaſons. But no danger of over-heating need be feared from the aſhes of that peat which grows, as turf, over ſandy bottoms, as great quantities do on Leighton heath in Bedfordſhire; for theſe are as much too lean, as the others are too rank. *Ellis's Modern Huſbandman, vol.* II.

Theſe aſhes are produced from land that is black and crumbly at top, under which lies the peat, to the depth of ſeveral feet. They do not burn the peat in the field for aſhes, by choice, becauſe the peat is burnt for the aſhes when it cannot be dried ſufficiently for ſale: and then it is burnt in large heaps, with a ſmothering fire: as is likewiſe the ſuperficial black earth or moory ſoil, together with the refuſe of the peat: the aſhes of theſe are laid up in round or long heaps, riſing at top like the ridge of a houſe, in order to throw off the rain, and keep them dry, till they are ſold. Sometimes they are laid under dry ſheds, or in-houſes, to ſave them from wet, which they cannot be wholly protected from by laying them up in ridges expoſed to the weather, into which the rain penetrates for ſome inches deep: and theſe aſhes are never ſo good manure as thoſe that are kept dry.

Near the ſurface of the peat-earth here, there is ſometimes a bed of whitiſh earth, called maum, which is a compoſition of earth and very ſmall ſhells of the periwinkle kind: this is alſo burnt to aſhes for manure, and the quantity of it in ſome places is ſo great, that the aſhes are of a whitiſh colour, and thoſe from the peat or mooriſh earth are reddiſh. The white aſhes are eſteemed to be as good manure as the red: and being a kind of ſhell-marl, would make good manure without being burnt: as indeed they rarely are thoroughly, though they ſeldom lay them upon land, till they have paſſed the fire, or are mixed with the aſhes of the peat-earth. The aſhes of the peat ſold for fuel, and burnt in chimneys, are much ſtronger manure than the aſhes burnt in the field; and if care is taken to keep them dry, are ſold for about double the price of the field aſhes.

We muſt not here omit the account which the ingenious Mr. Du Hamel has given of a kind of peat-aſhes made in France, as the ſame kind of earth with that from whence they are burnt may be doubtleſs found in many parts of England, if farmers would give themſelves the trouble to ſearch for it.

This peat is a blackiſh earth, reſembling the ſoil of ſome meadows. When burnt it emits a thick, diſagreeable ſulphureous vapour. A certain degree of moiſture helps to make it burn, though even then it waſtes but ſlowly. After it has once taken fire it burns of itſelf, but without producing any flame. It is of ſo cauſtic a nature, that it would ſtrip off the ſkin of the hands and feet of the men who knead it, if they did not take proper precautions againſt that inconvenience. Its aſhes retain this cauſtic quality; for the hands of thoſe peaſants who ſtrew them are often hurt by it, if the air be at all damp. This earth, in its natural poſition, runs in veins of different ſizes; ſometimes ſeven or eight feet thick, and thirty or forty feet long; and ſometimes they extend four or five hundred feet; after which the vein often fails at once, and perhaps is not found again till two or three miles off. Theſe veins generally lie pretty near the ſurface of the earth, ſeldom deeper than twelve or fifteen feet.

This earth is found only in marſhy places, which muſt ſometimes be drained before it can be come at. It ſhews itſelf by a ſlimy ſkin over the adjacent waters.

Three pounds of this earth being diſtilled in a retort, produced fifteen ounces of a bituminous oil, reſembling that extracted from pit-coal; and the reſiduum yielded, when waſhed, about half a pound of vitriol.

The method of preparing this earth, in order to render it fit for fertilizing land, is as follows: water is thrown over it, and two or three men knead it with their feet, till they bring it to the conſiſtence of a paſte, which is then made into cakes ſeven or eight inches in diameter. Theſe cakes are laid by to dry, though not to ſuch a degree but that there ſtill remains a little moiſture in them, that being neceſſary to facilitate their burning.

Their cakes thus prepared are piled up in the form of a pyramid, with ſufficient ſpaces between them for the fire to penetrate; and under this pyramid, which is built upon a kind of hearth, a little ſtraw and bruſh-wood is laid to ſet them on fire. Two or three days after their aſhes are ſpread with a rake, that they may cool. Some veins of this earth yield white aſhes, but they are not ſo good as thoſe of a reddiſh hue.

From fifty to ſeventy pounds of theſe aſhes are ſpread upon each acre of land in April or May; and in about a week's time the blades of corn, or graſs, if it be paſture ground, aſſume a new verdure, and appear ſurpriſingly ſtrong, even in the coldeſt ſoils.

Some of theſe bituminous earths are better than others. Care muſt be taken to begin to rake out the aſhes of each pyramid as ſoon as the greater part of it is burnt: for they would loſe a great deal of their virtue, if left on the fire till all that is inflammable be conſumed: nor would the fire go out in leſs than a fortnight or three weeks, if they were not ſcraped away as they are formed.

It would be needleſs to mention, that a greater quantity of the aſhes of an inferior quality muſt be uſed, than thoſe that are ſtronger, and conſequently better; but it may not be amiſs to obſerve, that, in general, wet lands require more than dry ſoils. The effects of this manure will be manifeſt for two or three years. It might be dangerous to renew it every year. *Traité de la Culture de Terres, tom.* V. *pag.* 226.

In Norfolk, aſhes are not in eſtimation as a manure; even thoſe of the hearth are in a degree neglected. The meadows and fens abound with peat-bogs, which in ſome places would be conſidered as ineſtimable ſources of manure. The peat in the meadows would no doubt afford an ample ſupply of aſhes. *Marſhall's Rural Economy of Norfolk.*

Pot-ASHES are the refuſe or aſhes remaining after the ſalt, called pot-aſhes, is extracted from them.

Theſe aſhes are of great ſervice to moſt ſorts of land; but as they have been in a great meaſure deprived of their ſalts, it is neceſſary to lay them on much thicker than other aſhes. A buſhel and a half of theſe may be uſed for a buſhel of freſh aſhes: but they ſhould always be mixed with ſome other light ingredient, which may be uſed in any quantity, if laid on very ſtiff land. If the land be not over ſtiff, they may be laid upon it with leſs mixture. *Bradley's Huſbandry*.

Soap-ASHES are a compoſition of wood-aſhes and lime, remaining after the ſoap-makers have drawn off their lye.

Soap-aſhes are likewiſe a very valuable manure, but there is great difference in the quality and effects of them. Thoſe from wood-aſhes are the weakeſt ſort of them; for the wood-aſhes being very light and ſpongy, their ſalts are ſoon diſſolved, and extracted by the lye; ſo that there remain but very few ſalts in the aſhes. But when the ſoap-boilers make uſe of kelp, which they ſometimes do, inſtead of wood-aſhes, the kelp being of a harder conſiſtence than wood-aſhes, the parts of it are not ſo eaſily ſeparated by the lye, and much more of the ſalts remain in the aſhes. But the ſoap boilers uſe another kind of pot-aſh, called barilla, which is imported from Spain in large lumps, which are much harder than common pot-aſh; and though the ſoap-boilers break this ſort very ſmall, and ſometimes ſcreen or ſift it, much more of its ſalts remain in it than in the pot-aſh; ſo that the aſhes from the barilla are ſtronger than any other; and if the ſame quantity of them was laid upon land, as is commonly laid of the wood-aſhes, they would burn and deſtroy the crop. Farmers ſhould therefore uſe ſoap-boilers aſhes with caution, till they know their quality and ſtrength. Wood-aſhes and pot-aſh are uſed in various places for making ſoap; but in and near London, very little of any but barilla. The aſhes from the barilla are a ſtrong rich manure, and ſold at 5s. per cart-load. They are not now ſo good as formerly, the ſoap-makers having found means to extract more of their ſalts from them; as they have alſo the ſalts from the lye, which were formerly rather ſuperior to the aſhes, as a manure, and was to be had for nothing, being all thrown away as uſeleſs.

They are an excellent manure, and were firſt uſed by the Flemings with very great ſucceſs. Two loads of theſe aſhes are ſufficient for an acre of arable land; and by the aſſiſtance of this manure the ground will not only yield a large crop, but may be ſown yearly, without leaving it fallow at any time. They ſhould be laid on the ground in the beginning of winter, that the rain may more eaſily diſſolve and waſh them in. Sir Hugh Platt tells us, that by manuring a piece of barren land at Biſhop's-hall in Middleſex, in the year 1594, he obtained an excellent crop of ſummer barley; that he meaſured the ſtalk and ear of one of theſe plants, and found it to be an ell and three inches in length, from the ground to the ſummit of the ear. We have given a figure of this ear of ſummer barley in its natural ſize, on plate III. fig. I. *Platt's Jewel-houſe of Art and Nature*.

A writer in the *Muſeum Ruſticum* declares, that he has for many years paſt received great benefit by uſing ſoap-aſhes as a manure, with which he almoſt conſtantly dreſſes his wheat lands; but never uſes it alone, on account of its hot burning quality.

"My method, adds he, is to make a large heap of dung and earth, that is, two loads of earth to one of dung, placed in alternate layers to rot. After this has undergone a ſtrong fermentation, I cauſe the whole heap to be turned and well mixed, leaving it for ſome time longer to mellow.

"I then procure the ſoap-aſhes, and mix them with the compoſt, in the proportion of one load of aſhes to ten of the compoſt, leaving, for ſome time, the whole to mellow together.

"When wheat ſeed-time comes, about the latter end of September, I cauſe about ten cart-loads of this rich compoſt to be laid in little heaps on each acre of the land I intend to ſow with wheat: this manure is immediately ſpread, and, ſowing my wheat broad-caſt, I plough it in together with the compoſt.

"The advantage reſulting from this practice, on ſtiff ſoils, are many; and particularly, if the farmer is the leaſt careful in preparing his tilth, he will have a clean crop, free from ſmut or weeds; a matter of no ſmall conſequence to him.

"I have tried this manure on lighter lands, and find it anſwer extremely well, provided it has lain a conſiderable time in the compoſt heap, to mellow and abate its natural heat; but it agrees beſt by far with clayey ſoils, and in ſuch is well worthy of being recommended as an excellent dreſſing for a wheat crop." *Muſeum Ruſt. vol.* IV. *pag.* 339.

Turf-ASHES are a good manure, but much inferior to peat-aſhes. Of this I ſaw once a remarkable inſtance. A field, whereof the ſoil was a poor gravel, and had a crop of the broad or red clover growing upon it, was dreſſed one ſide of it with peat-aſhes, and the other ſide with turf-aſhes; the farmer laid upon this field all the aſhes he had of theſe two ſorts, and the middle of the field had no dreſſing. The clover in the middle part not dreſſed was a very poor crop, the plants being ſhort, yellow, and ſtinted. The ſide dreſſed with turf-aſhes was much better than the middle, the plants being taller, of a better colour, and promiſed to be double the crop of the undreſſed: but that ſide dreſſed with peat-aſhes, produced a crop that appeared to be as much ſuperior to the part dreſſed with the turf-aſhes, as this laſt was ſuperior to the middle that had no dreſſing. The aſhes were ſown upon the clover by hand, and the improvement made upon the clover was ſo great, that the caſt of the ſower's hand was extremely plain next to the middle, and appeared like an indenture: and the vigour of the plants there, was ſo much greater than the undreſſed plants, that the extent of the peat-aſhes might be plainly diſtinguiſhed almoſt to an inch. This obſervation was made in the beginning of ſummer before the clover had arrived to its full growth.

Turf ASHES, are the aſhes procured by burning turfs, or the parings of the ſurface of heathy and mooriſh land. *See the article* BURN-BAKING.

Theſe parings, or turfs, are cut in a dry ſeaſon, and ſet up to dry thoroughly, leaning one againſt another; and, when dry, are piled into ſmall heaps or piles, about a quarter or half a load, in each, carried up exactly ſquare to a certain height, and then drawn up gradually in a pyramidical manner, ſo as to throw off any accidental ſhowers. In a very dry ſeaſon even the covering of theſe piles may be carried home, and ſtacked or houſed indiſcriminately with the reſt; but in a wetter ſeaſon it is uſual to ſeparate and dry thoſe topmoſt turfs, if the weather allows, and to ſtack them ſeparately, to be uſed on the tops of fires, when large, as dampers. A ſtout labourer will, in a day, cut two waggon-loads of theſe turfs. The women and children can ſet them up to dry, and the women can pile them up.

Theſe aſhes, (in the moors of Yorkſhire, where, as the Rev. Mr. Comber informs us they are greatly uſed, the principal firing being turfs) are carried out daily, or once in two or three days, to the dunghill; and the farmer takes the opportunity of his firſt leiſure towards the end of the year, to carry them out to his meadow land, on which he lays them thicker or thinner, as he has more or leſs land which he apprehends to want them, or more or leſs of them. The firſt rains waſh them in, and the next ſummer never fails to ſhew their good effect.

It will be eaſily imagined, that as theſe aſhes are much finer, or more pulveriſed than thoſe of coals, ſo they inſinuate themſelves more into the ſoil, but are in their effects much leſs laſting. However, as every year brings a conſiderable ſupply, the farmer is leſs concerned that they are not a laſting manure.

In the moors of Yorkſhire, the farmer is ſo ſenſible of the efficacy of theſe aſhes, that it is become a proverb among them, "The better fire, the richer farmer." In conſequence of this principle, the farmer endeavours to procure all the aſhes he can from the cottagers who have no land. And hence a happy connection ariſes; for the poor cottager finding the article of carriage the chief part of the expence of his fuel, is wiſe enough to bargain with the farmer to bring him home ſuch a quantity of his turfs in conſequence of his aſhes.

Some farmers lay theſe aſhes on their ground in the ſpring; and if ſhowers follow, they will have their effect in the ſummer crop, though not ſo great as if they had been laid on at the end of the year. It muſt however be remarked, that he who lays on his aſhes in the ſpring, lays on what has been very lately made in the winter; and he who lays on at the latter end of the year, lays on what has been evaporating during the whole ſummer; ſo that it is not eaſy to ſay which method is the better. *Muſeum Ruſticum, vol.* V. *p.* 311.

ASPEN-TREE, a ſpecies of the poplar, and called by botaniſts, *populus foliis ſubrotundis dentato angulatis utrinque glabris*. Poplar-tree with roundiſh leaves, having an angular indenture, and ſmooth on both ſides.

The leaves of this tree ſtand upon long ſlender foot-ſtalks, ſo as to be ſhaken by the leaſt wind, from whence it has been called the trembling poplar, or aſpen-tree.

The method of cultivating this tree is the ſame in every reſpect as that of the abele-tree. *See* ABELE-TREE.

ASS, a creature well known in moſt parts of Europe, and proves very uſeful in many reſpects, if taken proper care of.

The horſe is trained up, great care is taken of him, he is inſtructed and exerciſed; while the poor aſs is left to the brutality of the meaneſt ſervants, and the wantonneſs of children, that ſo far from improving, he muſt be a loſer by his education; and indeed, had he not a large fund of good qualities, the manner in which he is treated is ſufficient to exhauſt them. He is the ſport, the butt, and the drudge of the vulgar; who, without the leaſt thought or concern, drive him along with a cudgel, beating, overloading, and tiring him. We do not remember, that, if there were no horſes, the aſs would be conſidered both with regard to himſelf and us, as the moſt uſeful, moſt beautiful, and moſt diſtinguiſhed of animals. Inſtead of being the firſt, he is now the ſecond; and from this accident alone he is held in no eſtimation. It is the compariſon that degrades him: he is conſidered, not in himſelf, but relatively to the horſe. We forget that he is an aſs; that he has all the qualities of his nature, all the gifts annexed to his ſpecies; and think only on the figure and qualities of the horſe which are wanting in him, and which it would be improper for him to have.

By his natural temper he is as humble, as patient, and as quiet, as the horſe is proud, fiery, and impetuous; he bears with firmneſs, and perhaps with courage, blows and chaſtiſements. He is ſober both with regard to the quantity and quality of his food, contenting himſelf with the moſt harſh and diſagreeable herbs, which the horſe and other animals will not touch. In water he is very nice, drinking only of that which is perfectly clear, and at brooks with which he is acquainted. *Buffon's Hiſt. Naturelle, tom.* IV.

The aſs, though a contemptible creature, is very ſerviceable to many that are not able to buy or keep horſes; eſpecially where they live near heaths or commons, the barreneſt of which will keep them, being contented with any traſh, dry leaves, ſtalks, thiſtles, briars, chaff, and any ſort of ſtraw is excellent food for them; they require very little looking after, and will ſuſtain labour, hunger, and thirſt, beyond moſt creatures. They are ſeldom or never ſick; and endure longer than any other creature. They may be made uſe of to plough light lands, to carry burdens, to draw in mills, for which they are very excellent, to fetch water, or any other odd things. They are very uſeful for their milk, which is an excellent reſtorative in conſumptions, and other weakneſſes: but they would be of much more advantage were they uſed, as they are in foreign countries, for the breeding of mules. *See the article* MULE.

The ſhe-aſs, if you have any regard to their breed, ſhould be covered between the months of March and June. The beſt age to breed from, is from three years old to ten, and you ſhould let the young aſs ſuck two years, and not work them till they are three years old.

Thoſe are reckoned the beſt ſhape that are well ſquared, have large eyes, wide noſtrils, long necks, broad breaſts, high ſhoulders, a great back, ſhort tail, the hair ſleek and of a blackiſh colour: their ſkins make the moſt durable ſhoes of any ſort of leather. *Mortimer's Huſbandry, vol.* I. *pag.* 222.

ASTHMA. *See* BROKEN-WINDED.

ATMOSPHERE, the vaſt body, or collection of air which ſurrounds the earth to a very conſiderable height.

Clouds, which are precipitated in drops of rain for the ſervice of mankind, do not conſiſt wholly of watry particles; for beſides aqueous vapours and what theſe contain, there are raiſed from the ſurface of the earth into the air, ſulphureous and ſaline particles, which are alſo carried up into the clouds, and mixed with the aqueous vapours. Here we have a mixture of all ſuch ſubſtances, as it were, in their extremely ſmall parts, floating in the air together; and the effects of theſe ſulphureous and ſaline particles, thus mingled with aqueous vapours, are ſometimes very ſenſible, eſpecially in thunder and lightning; when the ſulphureous and nitrous particles taking fire, by the motion ariſing from heat, break out with the violence of flaſhes and noiſe, very much reſembling the effects of gunpowder.

Another proof that there are nitrous particles raiſed into the air, we have in the nouriſhment which rain, replete with theſe ingredients, give to plants more than any other water; and alſo from the collection of nitre or ſaltpetre in heaps of earth, out of which theſe principles derived from rain are known to be extracted, if theſe heaps of earth be expoſed to the air, ſo as to keep the wet weather from ſpoiling the operation. It is alſo a convincing argument, that theſe nutritive ingredients are of conſequence in vegetation, by plants in water refuſing to grow in droughty weather, notwithſtanding they have ſuch plenty of moiſture; from their being abſolutely at a ſtand when rain has been long a ſtranger to the earth, they are plainly ſeen to go forward with the buſineſs of vegetation, like thoſe plants which have been deprived of motion or growth, when the fine ſhowers deſcend, and continue to do ſo for ſome time.

Here then, in both caſes of the plants in a pond, there is water, but there are only in one theſe vegetative principles, which give motion to the plants, and conſequently thoſe ingredients are abſolutely neceſſary to vegetation; and therefore we may conclude, that water, when properly dilated by fermentation at the roots, is only an aſſiſtant to plants, in applying thoſe neceſſary principles, or helping to conduct them through the tubular interſtices of the fibres, or to float the nitrous particles through the whole ſyſtem of the operation in motion, or growth of vegetables, and not the food itſelf, or any ſort of nouriſhment, when diveſted of thoſe principles. Whether, therefore, the ſyſtem of exceeding fine fibres, or tubes of a plant at a ſtand in a pond, in a very droughty ſeaſon, admits that water undilated, for want of nutritive or fermenting principles, into its body, during the great want of rain; or whether it abſolutely refuſes to imbibe, or cannot attract, for want of a finer diviſion of its parts, any of it, as there are in it no nutritive ingredients, does not ſeem to admit of any doubt in favour of the latter queſtion, which, if true in nature, may poſſibly be of ſervice in the growth of ſome ſorts of plants, and perhaps ſave much trouble in attempting to force others forwards with ſome ſort of water.

Since it is plain that there is a vaſt quantity of nitrous, ſulphureous, and bituminous matter all over the ſurface of the earth, and that plants and animals abound with volatile ſalts, we need not wonder that the heat of the ſun fills the air with ſuch fine particles, and all ſorts of unctuous exhalations, by firſt expanding them, after which they riſe till they meet with air and other mixtures of the ſame ſpecific gravity. What are uſually called *ignes fatui*, ſeem to conſiſt of a more unctuous ſubſtance than other exhalations, for we find their oily particles are eaſily fixed, but not ſo ſoon ſpent as thoſe of ſulphur and nitre. Shooting ſtars are improperly ſo called, becauſe they are nothing more than exhalations kindled in the air; and if a long train of ſubſtances take fire at once, it is commonly termed *a dart*; and if there be many, and they continue in the ſame place, they are then called *beams*.

Thus we plainly ſee how full the atmoſphere is of theſe rich ingredients for the buſineſs of vegetation; and becauſe they are of ſuch vaſt conſequence to the growth of plants, we will enumerate the ſources of them upon the frame of the globe; from whence the ſun and wind borrow them, in order to diſperſe them properly in the air, that they may intimately mix, and deſcend with the rain-drops, and ſo be conveyed to the mouths of the fibrous tubes of plants, with the greateſt care and ſkill: from theſe ingredients firſt leaving the ſurface of the earth, through the whole proceſs of their various motions, configurations, and combinations, till they are prepared in the moſt exquiſite manner to be received into the bowels of vegetables, which we plainly ſee ſtand in great need of them, as without their friendly aſſiſtance, or ſome compoſitions of dung to reſemble them, they are unable from water and earth alone to go forward to maturity.

Salts are of various kinds, but all have a ſharp pungent taſte, though not all alike; and of theſe ſome are dug out of the earth like ſtone out of a quarry; others are made by art, by letting the ſea-water into ſhallow pits on the ſhore, and continue there till the aqueous particles are exhaled by the ſun and wind, and then the ſalt remains at the bottom. The ſalt is in its nature the ſame in both caſes; for the ſaline particles are not made by art in the combination of ingredients to imitate it; they are only ſeparated from the watry particles wherein they floated. The qualities of this excellent ingredient in vegetation are, that it eaſily diſſolves and melts readily in the open air, if it be refined from all heterogeneous matter; when the water wherewith it is entangled is any ways drawn off, there remains a groſs ſediment, but the finer parts are carried away with it: this ſediment is the only part the fire cannot melt, but reduces it to a calx.

This facility of the finer parts ſwimming, as they are ſpecifically lighter than water, contributes to the benefit of plants; or rather theſe fine ſaline particles are of the ſame ſpecific gravity with the water; that they may intimately mix with it, and be carried in thoſe vapours through all the neceſſary ſtages, till they return to the earth again. This quality of melting and diſſolving in water and air, ſets the finer parts at liberty, and prepares them to take wing with the common exhalations. And yet the ſediment, or groſſer parts, which are left behind, have their excellent uſes in helping the embrios of plants to ſend out their fibrous tubes, in ſearch after more refined particles, which either adhere to the ſuperficies of the particles of earth or air contained in their internal pores.

Nitre, of which there are ſeveral ſorts, natural and artificial, the former refining itſelf, and the latter refined by art, is a kind of ſalt, which eaſily takes fire, but like ſea-ſalt is eaſily reducible to a calx. The vapours, or particles of nitre, when they deſcend for the uſe of plants, are found to contain abundance of ſpirits; for the nitre, as a ſalt, is impregnated with them, which render it volatile, and the fluid extracted from it is very ſharp and corroſive. The calx to which nitre is reducible, as well as the calx of common ſalt, has its excellent uſe in vegetation; and when it is reduced by fire to this ſtate, it then takes the name of fixed ſalt, or rather the aſhes of ſalts: the benefit of this calcination to land is manifeſt from the aſhes of burnt vegetables, and other natural bodies reducible to a calx: for the rich principles, or food, if we may call it ſo, of vegetables, are contained more or leſs in all bodies whoſe parts can be thus ſeparated, as is evident from the operations in chemiſtry, which reduce bodies to their component parts, by the help of fire.

Sulphur is a liquid clammy ſubſtance, whoſe parts are ſoon ſeparated, and riſe up into the air with other vapours, and ſoon occaſions violent motions in the atmoſphere, and becomes entombed in the aqueous particles, and is with the rain brought down to the plants. Bitumen is pretty much of the ſame nature with ſulphur, and with it is found in great plenty in moſt bodies, but in the moſt remarkable manner, and in the greateſt quantities, in pit-coal; yet not in equal quantities, as ſome coals burn better than others, and conſequently may contain more or leſs of theſe principles, which are apt to burn. Naptha is a kind of bitumen, and the only difference is, that it takes fire ſooner than bitumen is obſerved to do, and is not ſo eaſily quenched; and this facility of admitting the heating particles, which throw theſe inflammatory bodies into a ſpeedy motion internally, is of great uſe in the different degrees of the plant's growth.

Maltha ſeems to be a ſpecies of naptha; its properties, as they appear to common obſervation, are, that if it touches any thing, it ſticks ſo faſt to it, as not eaſily to be ſeparated; and water thrown on it in moderate quantities, does but the more inflame it, and earth alone is able to quench it. This valuable ingredient, when it deſcends in the drops of rain, adheres very intimately to the internal parts of the ſoil, both in the ſuperficies and the concave parts of the pores; and other deſcents of rain increaſe the motion of the internal parts of the particles of maltha, and thereby promote a fine dilatation in the tubular interſtices of the fibres of plants, and duly contribute to the acceleration of that motion in them, which is neceſſary to the different ſtages of their growth and nouriſhmeut. Before the fine parts of the maltha are in readineſs, or duly prepared by moiſture, and their well regulated fermentation, and while it is waiting for the deſcent of more rain, it is diveſted of all internal motion, and confined as a priſoner, till the other requiſites to the plant's welfare are properly aſſembled, and ready to perform their offices.

Theſe are the chief materials which give motion to plants, and of which the latter are found to conſiſt, when they are analiſed, unfolded, or ſeparated into their component parts by chemiſtry. The profeſſors of that art call the volatile ſpirits, ſulphur, and ſaline particles, the active principles; becauſe theſe, when duly prepared, and exactly applied to the mouths of the fibres, become the ſole agents, and by their continual motion cauſe the whole action of the plant.

The vapours thus raiſed from the ſurface of the earth, become the original matter of all meteors, or heterogeneous ſubſtances, fit for the production of the vegetable world; and conſequently an inſtrument in the wiſe appointment of Divine Providence, for the preſervation of man, and all ſubordinate animals. When theſe heterogeneous vapours are thus lifted up above the earth, one degree of cold condenſes them into larger globules, which then becoming ſpecifically heavier than the atmoſphere, fall in drops of rain, and bring down all thoſe treaſures intombed in them. A greater degree of cold produces a coagulation of the heterogeneous vapours, which ſhoot like ſalts into various forms, united into certain angles, and make the flakes of ſnow, which ſtill contain the nutritive principles.

A third, or ſtill greater degree of cold, combines the vapours into a harder ſubſtance, wherein the valuable ingredients are intombed, and they deſcend in what we call hail; but if the cold condenſes the vapours before they riſe high above the ſurface of the earth, they will be unable to aſcend, but will hover about, and fill the lower part of the atmoſphere with what is uſually called a fog or miſt; and if the cold be ſtill more intenſe, the miſt is frozen to every twig and blade of graſs in form of a white incruſtation, which is called rime. When the air in the day-time is warm, and the vapours buoyed up in it are too fine to be then viſible, they will be condenſed by the coolneſs of the evening, and deſcend on the vegetables in the form of dew; and if the evening of ſuch a fine day be cold enough to freeze, then, inſtead of a dew, the ſurface of the ground will be covered with what is commonly called a white froſt. Theſe are the various ways appointed to bring down again upon the earth the treaſures that were taken from it, in order to be prepared and properly ſpread over the globe, by methods and contrivances equally beautiful and ſurpriſing; and all this for the ſupply of needy man, who is, when theſe bleſſings are for a conſiderable time with-held from him, turned to deſtruction.

But among the riches of the atmoſphere for the production of vegetables, we muſt not forget the conſequences which the air itſelf is of to them, as we have already obſerved under the article air. *See* AIR. *Randall's Semi-Virgilian Huſbandry.*

AVENUE, a walk planted on each ſide with trees, leading to an houſe, wood, &c.

The Engliſh elm will do in all grounds, except ſuch as are very wet and ſhallow; and this is preferred to all other trees, becauſe it will bear cutting, heading, or lopping in any manner, better than moſt others. The rough or ſmooth Dutch elm is approved by ſome, becauſe of its quick growth: this is a tree that will bear removing very well; it is alſo green almoſt as ſoon as any plant whatever in ſpring, and continues ſo as long as any, and it makes an incomparable hedge, and is preferable to all other trees for lofty eſpaliers. The lime is valued for its regular growth, and fine ſhade: the horſe-cheſnut is proper for all places that are not too much expoſed to rough winds. The common cheſnut will do very well in a good ſoil, and riſes to a conſiderable height, when planted ſomewhat cloſe, though, when it ſtands ſingle, it is rather inclined to ſpread than grow tall. The beech is a beautiful tree, and naturally grows well with us in its wild ſtate, but it is leſs to be choſen for avenues than the beforementioned, becauſe it does not bear tranſplanting well, but is very ſubject to miſcarry. Laſtly, the abele is fit for any ſoil, and is the quickeſt grower of any foreſt-tree. It ſeldom fails in tranſplanting, and ſucceeds very well in wet ſoils, in which the others are apt to fail. The oak is but little uſed for avenues, becauſe of its ſlow growth.

The old method of planting avenues was with regular rows of trees, and this has been always kept till of late; but we have now a much more magnificent way of planting avenues: this is, by ſetting the trees in clumps or platoons, making the opening much wider than before, and placing the clumps of trees about three hundred feet diſtant from one another. In each of theſe clumps there ſhould be planted either ſeven or nine trees; but it is to be obſerved, that this is only to be practiſed where the avenue is to be of ſome conſiderable length, for, in ſhort walks, this will not appear ſo ſightly as ſingle rows of trees. The avenues made by clumps are fitteſt of all for parks. The trees in each clumps ſhould be planted thirty feet aſunder, and a trench ſhould be thrown up round the whole clump, to prevent the deer from coming to the trees to bark them. *Miller's Gard. Dict.*

AVER, a general name for a labouring beaſt of any kind.

AVERAGE, a term uſed by the farmers of many parts of England for the breaking up of corn-fields; otherwiſe called eddiſh, or roughings.

AVER-LAND, the land ploughed by the tenants for the uſe of their lord.

AUGUST, the eighth month of the civil year.

This month returns the countryman's expences into his pockets, and encourages him to another year's adventure. If it proves dry, warm, and free from high winds, it ſaves a great deal of the huſbandman's expence.

You may yet twifallow, alſo lay on your compoſt or ſoil, on your lands intended either for barley or wheat.

Carry wood, or other fuel home, before winter approaches and renders the roads deep and heavy.

Provide good ſeed, and well picked, againſt ſeed-time.

Put up your ewes and cows you do not like, to fatten.

This is generally the principal harveſt-month for all ſorts of grain, therefore make the beſt uſe of good weather while you have it.

About the end of this month you may mow your aftergraſs, and alſo clover, ſaintfoin, and other French graſs. Geld lambs, and make the ſecond return of your fat ſheep and cattle. *Mortimer's Huſbandry, vol.* II.

AUGRE, an inſtrument much uſed by carpenters, wheelwrights, &c. for boring large round holes. It conſiſts of a wooden handle and an iron blade, terminated with a ſteel bit.

A common augre may be very uſefully applied to try the nature of the under ſoil, and layers of earth, in order to know what may be expected from them, with regard to the vegetation of plants. In order to this, three augres will be neceſſary; the firſt of them about three feet long; the ſecond ſix; and the third ten. Their diameters ſhould be near an inch, and their bits large, and capable of bringing up part of the ſoil they pierce. An iron handle ſhould be fixed croſs-ways to wring it into the earth; from whence the inſtrument muſt be drawn up, as often as it has pierced a new depth of about ſix inches, in order to cleanſe the bit, and examine the ſoil. But the borer, an inſtrument invented by the marquis de Tourbilli, is much better adapted to this operation. *See the article* BORER.

AVIARY, a place ſet apart for the feeding and propagating birds. An aviary ſhould be ſufficieutly large as to allow the birds a conſiderable freedom of flight; and turfed, to avoid the appearance of foulneſs on the floor.

AWMS, the beard of wheat or barley. The word is, in ſome parts of England, pronounced *ails*.

AXIS, or *axle-tree*, of a waggon, cart, &c. is the ſtrong piece of wood or iron which ſupports the carriage, and round the extremities of which the wheel turns. *See the articles* CART *and* WAGGON.

B

BACK-SINEW, in a horſe, is that ſtrong ſinew extending along the hinder part of the ſhank from the knee to the heel, into which it is inſerted.

The back-ſinew is ſo very ſubject to be hurt or ſtrained, that it is conſidered as one of the moſt common and uſual accidents that happens to a horſe; it generally proceeds from hard riding upon dry grounds, and from other cauſes, where the roads are ſtony and hard, and ſometimes where they are poachy.

It is eaſily perceived by the ſwelling of the ſinew, which ſometimes extend from the knee down to the heel; and when it is ſo, a horſe does not care to ſet his foot even upon the ground; but, for the moſt part, in his ſtanding, ſets it before the other.

The uſual way of curing this malady is with cold charges, which often ſucceed very well, if frequently renewed; ſome uſe curriers ſhavings bound round the knee with a bandage, and this alſo anſwers very well in ſome caſes; but there is nothing either ſo ready or efficacious as vinegar or verjuice mixed with bole, being often in a day ſoaked well into the ſinew warm; and if any thing of the lameneſs or ſwelling remains after this, and after the heat and inflammation is gone off, a mild bliſter, that has nothing corroſive in it beſides the cauſtic ſalt of the flies, will, generally ſpeaking, effectuate a cure, and bring the ſinew fine.

When hot and relaxing oils mixed together are uſed to the back ſinew, which many practitioners are fond of, becauſe they ſometimes ſucceed in horſes that have their ſinews ſtrong and rigid, yet they are apt to engender windgalls of a bad kind, or make the veins on each ſide the ſinew to be full and gorged; and horſes have been known to be lame for two or three years together with theſe varixes in the veins. Bliſtering in this caſe has very little or no effect, firing through the vein till the blood comes being only ſufficient to remove that weakneſs. After the firing, the whole leg from the knee down to the heel, and all the hollow places on both ſides, muſt be charged with a good ſtrengthening plaiſter, which will perfect a cure, eſpecially if the horſe be turned to graſs for a month or five weeks, or, in the winter, if he runs a little while in a ſmooth yard, where he has good dry litter. *Gibſon on the Diſeaſes of Horſes.*

BACON, the fleſh of a hog dried in the ſmoke.

A writer in the *Muſeum Ruſticum*, vol. III. pag. 234, has given us the following method of making bacon in Somerſetſhire:

The ſeaſon for killing hogs for bacon is between September and Chriſtmas. When you kill a large hog for bacon, lay the ſides in the ſalting-troughs, and ſprinkle them pretty heavily with bay-ſalt: then leave them twenty-four hours to drain away the blood, and ſome of the over-abounding juices.

After this take them out, wipe them very dry, and throw away the draining. Then take ſome freſh bay-ſalt, and heating it well in a large iron frying-pan, rub the meat very well with it; repeating this work every day for four days, and turning the ſides every other day.

If the hog be large, keep the ſides in brine, (turning them ten times) for three weeks; after which take them out, and let them be thoroughly well dried in the uſual manner: if they are not fully dried, they will neither keep ſo well, nor eat ſo fine.

BADGER, the name of an animal, common in many parts of England; and called by ſeveral names, as a gray, a brock, a boreſon, or a bauſon.

Badgers are almoſt as pernicious a creature to the huſbandman as a fox, though not ſo ſubtle, nor can they ſo eaſily catch their prey; but for what they can catch, as new fallen lambs, young pigs, and poultry, they are as bad. The way to catch them is with a ſpringe, or a ſteel-trap, or to dig a pit acroſs their path five feet deep, and about four feet long, making it narrow at the top and bottom, and wide in the middle. This muſt be covered with ſome ſmall ſticks and leaves, ſo as that the badger may fall in when he comes upon it. Some hunt them into their holes in a moon-ſhine night, and then dig them out. *Mortimer's Huſbandry, vol.* I. *pag.* 314.

BAG, a name given by farriers to a medicine for recovering a horſe's appetite when loſt. It is done in this manner: they take an ounce of aſſa-fœtida, and an equal quantity of the powder of ſavin; theſe ingredients they put into a bag, which they faſten to the horſe's bits, keeping him bridled for two hours, two or three times a day: as ſoon as the bag is taken off, he will immediately eat. The ſame bag will ſerve a long time.

BAKING *of land.* If ſome ſorts of ſtiff and binding land be ſown dry, and a ſcud of rain falls before the earth has time to ſettle, it is obſerved that the cruſt of ſuch land will bake, ſo that the corn cannot come through, to the great damage of the crop: this evil does not happen if ſuch a ſcud of rain be followed by cool cloudy weather, and not hot ſun-ſhine; for then the earth will not be ſo hollow as to be baked. The beſt way to prevent this is, to roll it immediately after ſowing, which faſtens the earth together, whereby the ſun has not that power of piercing into it, and conſequently not of baking it.

Land of this kind ſhould, therefore, be ſown as often as poſſible with winter corn, ſuch as wheat and vetches; for if wet follows the ſowing, the ſun is not ſtrong enough at that time of the year to ſcorch the ground up, and bind it; and it is obſerved, that this ſort of ground has been always lucky for vetches, probably for the above reaſon. *Liſle's Obſervations in Huſbandry, vol.* I. *pag.* 26.

BALK, a piece of land which has been either caſually overſlipped, or not turned up in ploughing; or carefully left untouched by the plough, for a boundary between lands, or ſome other uſe.

BANDS, a ſmall parcel of the longeſt wheat taken from the grips, and twiſted together at the ear-ends, for binding the wheat into ſheaves.

The bands ſhould be laid in the morning, that they may not crack; for the ſtraw will not twiſt after the ſun is up, but will be brittle, and break off below the ears. The turning of three or four of the ſtubble or bottom ends of the ſtraw to the ears of the band, helps greatly to add to its ſtrength and toughneſs.

The bands for binding up the ſheaves ſhould not be ſpread but in fair weather, becauſe being preſſed down by the grip or two which it is neceſſary to lay upon them to keep them in their places, and prevent their being untwiſted by the ſum, they will grow ſooner than any other part of the corn, if rain ſhould come; for they cannot dry on account of their lying undermoſt. But though the bands muſt always be made while the morning dew is upon them, the ſheaves ought by no means to be bound up wet: if they are, they will certainly grow mouldy.

Farmers do not always attend ſufficiently to the binding up of their ſheaves, but ſuffer the reapers, for diſpatch, to tie the bands juſt underneath their ears, inſtead of binding them at the other end; the conſequence of which is, that they will hardly hold together to be flung into the cart, and will certainly be in great danger of falling to pieces before they are thraſhed.

If a little rain be foreſeeu in harveſt time, it is beſt to bind the grips into ſheaves as faſt as they are made; becauſe ſmall ſhowers will wet the ſingle grips ſo much, that they cannot be bound up, and theſe ſhowers may be the forerunners of greater rains. The ſheaves being bound will ſoon dry after ſuch wet. But if a hard rain is foreſeen, the beſt method is not to bind the wheat into ſheaves, becauſe they will then be wet to the bands, and muſt be opened again. Mr. Liſle tells us, that one of his neighbours to whom this happened, unſheafed ſome of his wheat to dry it, and opened it and turned it ſo often, that the ears broke off, whereby he loſt half his corn; caution therefore ought to be uſed in this caſe, leſt by curing one evil we create a worſe. *Liſle's Obſervations in Huſbandry, vol.* I. *pag.* 333.

BANDS *of a ſaddle* are two pieces of iron, flat, and three fingers broad, nailed upon the bows of a ſaddle, one on each ſide, contrived to hold the bows in the ſituation that makes the form of a ſaddle.

BANE, in ſheep, the ſame as rot. *See the article* ROT.

BANGLE-EARS, an imperfection in a horſe, which may be remedied in the following manner: place his ears as you would have them ſtand, and then with two little boards, or pieces of trenchers, three fingers broad, having two long ſtrings faſtened to them, bind the ears ſo faſt in the places where they ſtand, that they cannot ſtir; then behind the head, and the root of the ears, you will ſee a great deal of empty, wrinkled ſkin, which you muſt pull up with your finger and thumb, and clip away with a pair of ſharp ſciſſars all the empty ſkin cloſe by the head; then with a needle and red ſilk, ſtitch the two outſides of the ſkin together, and heal the wound with a mixture of honey and turpentine: when this is done, take away the ſplints that hold up the ears, and in a little time they will keep the place where you fixed them, without alteration.

BANK, a heap of earth piled up to keep out the water of a river, lake, or the ſea.

Sloping banks are the beſt ſecurity againſt the encroachments of the ſea, of rivers, or of lakes; making proper allowance for the weight of water, and violence of the waves. Theſe banks ſhould be raiſed about two feet above the level of the water at the higheſt tides, and their ſtrength ſhould be proportioned to the force of the water intended to be fenced off. When a river is too much confined, it ſwells conſiderably upon a flood, and conſequently requires banks of greater height and ſtrength than would otherwiſe be neceſſary: though it will ſometimes break even theſe, and carry all before it, if a ſufficient ſpace be not allowed for the increaſe of its water: but when ſuch a ſpace is left, the waters ſpread, and ſeldom riſe more than two or three feet above their uſual level. In ſome caſes a breadth of fifteen or eighteen feet on each ſide may do; but in others, fifty, eighty, or an hundred feet, or perhaps ſo many yards, according to the largeneſs of the river, muſt be left open for that purpoſe. It is beſt to err on the ſafe ſide; eſpecially as the ground that is left between the banks and the river will be far from being loſt; for it will afford good grazing in the dry ſeaſons of the year, and may be planted with oſiers, and willows, and other trees of that kind; but theſe ſhould never be planted upon the banks, leſt the winds ſpoil and tear them, by ſhaking the trees, and looſening their roots.

In the iſle of Ely, it is common to ſee great banks diſtant one or two hundred yards on each ſide from the channel of the river; and when they are ſo made, they are always ſafe: but where the diſtance between the banks is narrow, there, and there only, the banks are in danger of being broken down, and the country of being overflowed.

If a conſiderable body of water is to be guarded againſt, dig a trench ten or twelve feet wide, and two or three deep, or more, according to the height of the bank required. Lay all the ſoil that is taken out of this trench, on that ſide of it which lies towards the water, and leave a ſpace of two or three feet between the trench and the foot of the bank. Let the bank be made with an eaſy ſlope of fifteen or eighteen feet in length towards the water, allowing the ſlope two and a half, or three feet fall to one in height; but the inſide ſlope need not be more than eight or nine feet, which is a foot and a half ſlope to one foot perpendicular. The bank thus raiſed five or ſix feet high, according as the floods require, will be two feet wide at the top, where it ſhould be well flatted, that people may walk upon it. Let it then be covered with gravel dug out of the channel of the water, by which means the river will be deepened, and the bank rendered ſtronger; and to add to the latter, ſow it very thick with graſs-ſeed. This will be found much better than turfing it with the ſods taken from off the trench, or ſome neighbouring ground; becauſe the ſods are apt to ſhrink, open, and part from one another in dry weather, and are then liable to be waſhed away with the next flood; whereas in thus much cheaper way, a cloſe covering of graſs, even long enough to mow, will be formed in a month or two; far fitter than ſods to break the ſurface of the bank; for any tolerable ſoil may be very ſoon brought to have a coat of graſs, by only raking it fine, and ſowing it with graſs-ſeeds. In a week or ten days in the ſpring, or ſummer, the graſs will be up, and grow to ſuch a height in a month or ſix weeks, as to be fit for mowing.

Some have attempted to guard againſt inundations by building walls of ſtone and lime, where the materials are in plenty. The great danger here is their being undermined, and that chiefly by the waters ſtriking with force againſt the bottom, upon meeting with reſiſtance from the wall. But this may be eaſily guarded againſt by laying a row of flat ſtones lower than the bottom of the river; for the water ſtriking againſt theſe ſtones, turns off without any danger to the foundation.

The broad trench within the bank, beſides affording materials for making the bank and ſlopes, is attended with the farther advantage of ſerving for a drain to the inland ground. Theſe trenches ſhould always be carried as far as the banks, particularly when theſe are intended to fence off a riſing tide; and in the loweſt part of the ground a ſluice with a valve, flap-door, or flood-gate, ſhould be placed in the bank, where it will both diſcharge the inland water, when the tide is out, and prevent its flowing in. The ſeaſon of the year freeſt from floods ſhould be choſen for making theſe banks, that the bank may have time to ſettle and grow firm before the heavy rains come on. It is alſo adviſeable to be as expeditious as poſſible in this work. For if it be begun in a dry ſummer, and finiſhed in a month or two, there will be little danger of being interrupted by extraordinary floods or violent ſtorms, either of which might do more harm in one day than could be repaired in a fortnight.

The exact dimenſions of the bank, and of the ditch within it, cannot be preciſely aſcertained by any general rule; becauſe both tides and floods riſe to different heights, and have different force in different places and circumſtances. The ſtrength above-mentioned may be ſufficient for banks in common caſes; but in others, where a great body of water, or a powerful tide is to be oppoſed, they may be, as the memoirs of the Berne Society (*tom.* II. *part* II. *pag.* 262.) adviſe, four feet or more wide at the top, with a baſis proportioned to their height, as three and a half are to one; or, if it be deſired to make them ſtill more ſolid, as four to one; ſo that if the bank be four feet and a half high, its baſis in the former caſe will be fourteen feet wide, and in the latter eighteen.

The Dublin Society for the advancement of agriculture informs us (Numb. XVII. *for April* 1737) that "Lord Limerick has recovered between four and five hundred acres of very rich ſalt-marſh, at Dundalk in Ireland, and effectually ſecured them from the ſea, by ſuch banks as are above deſcribed; and by the ſame method many hundred thouſand acres have been recovered from the ſea in Cambridgeſhire, Lincolnſhire, and other parts of England; not to mention the low lands of Holland, which are indeed ſecured againſt the violence of the ſea by no other means.

"If there be a neceſſity for making banks on a ſtrand where nothing but ſand can be met with, thoſe banks ſhould be large, and the ſlope very broad and extended; and if graſs ſeed will not grow on them, let ſea-weeds be planted. Theſe with ſticking furze, ſtraw, or lopping of trees, will help to keep the banks together."

But a better method, and more effectual, is given by Dr. Hales in the Philoſophical Tranſactions, from the experience of Dr. Wark, a clergyman in Scotland. The method conſiſts in fixing to the bottom of the channel, a breadth of furze proportioned to the force it is to reſiſt. The ſand or ſlime, as either abounds, will ſoon ſettle among the branches of the furze; and when the firſt bed of the furze is thus interwoven or covered, another bed of furze is to be laid on as before, and ſo on, till the bank is raiſed to a ſufficient height. Dr. Wark aſſures us, that by this ſimple method a bank was made near Holy-iſland ſo ſtrong, that it became a bar againſt the ſea itſelf.

"It ſometimes happens, that the ſea flows in through a narrow gut or paſſage, by which the inland waters are diſcharged, and then extends itſelf, and covers a great deal of ground. When this happens, if the inland waters cannot be diverted into another courſe, ſince a paſſage muſt be left for their diſcharge; let a ſtrong ſluice be fixed in the loweſt part of the channel, with large piers of ſtone, running out for its ſupport, and a ſtrong foundation of wood or broad ſtones for the water to run over. When this is done, let the banks of ſand, or other ſoil near at hand, be made in the manner already mentioned, on each ſide of the ſluice.

"The reaſon why it is adviſed, in places where a ſluice is to be made, to begin the work by this rather than by the bank, is, that while the tides have liberty to flow in and out at a great breadth, the ſluice may be made in any part of the channel, without being much incommoded by the tide; whereas if it be deferred till the banks on each ſide are made, the force of the tide, when confined to a narrow paſſage, will tear up all before it, and render the building of the ſluice impracticable: and upon the ſame account, the banks ſhould be begun at the loweſt part of the channel, and carried on from thence to the upper grounds.

"If, by any accident, the waters ſhould ſwell ſo high as to overflow and tear the banks, farther miſchief may be prevented by fixing with all expedition, a ſail-cloth, or ſheet of linen at the bottom of the bank, where the flood breaks in; for if this be done in time, the water will flow over the cloth, without waſhing away the bank.

"In every improvement, the expence ſhould be particularly conſidered. That of making banks in this method is ſmall. In low grounds the ſoil is ſoft, and dug with eaſe, and all the work may be done with the ſpade and ſhovel, without pick-axes, which muſt be uſed in upland ground; and the materials are on the ſpot. All the charge will be often more than repaid by the firſt year's improved crop of graſs, and the ſafety of the meadows. The produce of ſucceeding years will amount much higher, and the huſbandman will be out of all danger for the future of having his lands overflowed and ſpoiled. Farmers have frequently ſuſtained more damage from the hay deſtroyed in one ſeaſon by floods, than the whole value of what it would have coſt them to incloſe and bank their meadows, and free them from all hazards."

BANQUET, is that ſmall part of the branch of the bridle that is under the eye, which being rounded like a ſmall rod, gathers and joins the extremities of the bit to the branch, and that in ſuch a manner, that the banquet is not ſeen, but covered by the cap, or that part of the bit which is next the branch.

To BAR *a vein*, implies an operation in farriery performed in the following manner: they open the ſkin above and below the place where the operation is to be performed, and after freeing the vein from the ſurrounding parts, they tie it at thoſe openings with two ligatures; after which they open the vein between the ligatures in order to diſcharge the blood. This operation is performed upon the veins of a horſe's leg, and other parts of his body, in order to ſtop the courſe, and leſſen the quantity of malignant humours that prevail there.

BARB, a general name for horſes imported from Barbary.

The cheſt of the barb is long and ſlender, riſes beautifully from the withers, his mane little, his head well ſhaped, ſmall, and lean; his ſhoulders flat and ſlender; his withers narrow and plump; his back ſtraight and ſhort; and his flanks and ſides round, and not bellying out; his haunches firm and well ſhaped; his croop generally ſomewhat long, and his tail placed pretty high; his thigh well ſhaped, and ſeldom flat; his leg handſome, well-ſhaped, and without long hair at the paſtern joint; his foot well made, but his paſtern often long.

Barbs are of all colours, but generally brown. They are ſomething negligent in their goings; but, properly encouraged, ſhew an amazing ſwiftneſs and vigour; they are very light and fit for running; and ſeem of all others the fitteſt to breed from. It were, however, to be wiſhed, that they were a little taller, the largeſt barely exceeding fourteen hands; and one of fourteen hands and an inch is very extraordinary. Experience has, however, ſhewn, that in England, France, &c. they get colts larger than themſelves. Among the barbs, thoſe from the king of Morocco are accounted the beſt, except the mountain barbs. Thoſe of the reſt of Mauritania are inferior to them, as are alſo thoſe of Turkey, Perſia, and Armenia. All horſes from a hot climate have a ſmoother coat than others. *Buffon's Hiſtoire Naturelle, tom.* IV.

BARBELS, or *barbs*, are excreſcences or knots of ſuperfluous fleſh, growing under the tongue, and may be ſeen by drawing it aſide.

They are cured by cutting them cloſe off, and waſhing the wounded part with brandy, or ſalt and water. *Bartlet's Farriery, pag.* 262.

BARBERY. This ſhrub is in general ſuppoſed to cauſe the mildew in wheat, if it is growing within a ſhort diſtance of the crop. Mr. Young, in his 7th volume of his Annals of Agriculture, gives the following inſtance in a letter from Mr. Macro: "Having heard by ſeveral farmers, that wheat would mildew where a barbery buſh grew, I concluded it was only becauſe the ſoil on which they naturally grew, was likewiſe the moſt natural to that diſtemper; I therefore ſent for a plant at the diſtance of a mile or two, (not having any of them on my farm) and planted it on a rich ſoil, with a clay bottom. The buſh grew well, and I, three years following, planted wheat round it. The firſt year, in the month of October; the ſecond in the month of Auguſt; and the third in September; and all were ſo compleatly mildewed, that the beſt of the little grain it produced was only about the ſize of their rye, and that without any flour." This was in his garden, and more likely to mildew than on old wheat land. However he planted ſome on the oppoſite ſide of the garden, one of the years, which produced very good grain, although the ſtraw was a little mildewed.

Mr. Marſhal, in his Rural Economy of Norfolk, on the ſame ſubject, ſays, "It has long been conſidered as one of the firſt of vulgar errors among huſbandmen, that the barbery plant has a pernicious quality of blighting the wheat which grows near it.

This idea, whether it be erroneous or founded on fact, is no where more ſtrongly rooted than among the Norfolk farmers; one of whom, mentioning with a ſerious countenance an inſtance of this malady, I very faſhionably laughed at him. He, however, ſtood firm, and perſiſted in his being in the right; intimating, that ſo far from being led from the cauſe to the effect, he was, in the reverſe, led from the effect to the cauſe: for obſerving a ſtripe of blaſted wheat acroſs his cloſe, he traced it back to the hedge, thinking there to have found the enemy; but being diſappointed, he croſſed the lane into a garden on the oppoſite ſide of it, where he found a large barbery-buſh in the direction in which he had looked for it. The miſchief, according to his deſcription, ſtretched away from this point acroſs the field of wheat, growing broader and fainter (like the tail of a comet), the farther it proceeded from its ſource. The effect was carried to a greater diſtance than he had ever obſerved it before; owing, as he believed, to an opening in the orchard behind it to the ſouth-weſt, forming a gut or channel for the wind.

Being deſirous of aſcertaining the fact, be it what it may, I enquired further among intelligent farmers concerning this ſubject.—They are, to a man, decided in their opinion as to the fact; which appears to have been ſo long eſtabliſhed in the minds of principal farmers, that it is now difficult to aſcertain it from obſervations; barbery plants having (of late years more particularly) been extirpated from farm-hedges with the utmoſt care and aſſiduity: one inſtance, however, of miſchief, I had related to me, and another I was myſelf eye-witneſs to. Mr. William Barnard, of Bradfield, ſays, that ſeeing a patch of his wheat very much blighted, he looked round for a barbery buſh; but ſeeing none conſpicuous in the hedge, which was thick, he with ſome difficulty got into it, and there found the enemy. He was clearly decided as to the fact. Mr. William Gibbs, of Rowton, telling me that a patch of his wheat was blighted in the ſame manner and that he believed it to proceed from ſome ſprigs of barbery which remained in the neighbouring hedge (which a few years ago was weeded from it) I went to inſpect the place; and true it was, that near it we found three ſmall plants of barberry, one of which was particularly full of berries. The ſtraw of the wheat is black; and the grain, if it may be ſo called, a mere huſk of bran; while the reſt of the piece was of a much ſuperior quality. To endeavour to aſcertain the truth of this opinion, I had a ſmall buſh of the barbery plant ſet in February or March laſt, in the middle of a large piece of wheat.

I neglected to make any obſervations upon it until a little before harveſt; when a neighbour (Mr. John Baker, of South-Reps) came to tell me of the effect it had produced.

The wheat was then changing, and the reſt of the piece (about twenty acres) had acquired a conſiderable degree of whiteneſs (white wheat); while about the barbery buſh there appeared a long, but ſomewhat oval-ſhaped, ſtripe, of a dark livid colour, obvious to a perſon riding on the road at a conſiderable diſtance.

The part affected reſembled the tail of a comet, the buſh itſelf repreſenting the nucleus; on one ſide of which the ſenſible effect reached about twelve yards; but on the other, not more than two yards; the tail pointing towards the ſouth-weſt: ſo that probably the effect took place during a north-eaſt wind.

At harveſt, the ears near the buſh ſtood erect, handling ſoft and chaffy; the grains ſlender, ſhrivelled and light.—As the diſtance from the buſh increaſed, the effect was leſs diſcernible, until it vaniſhed imperceptibly.

The reſt of the piece was a tolerable crop; and the ſtraw clean, except on a part which was lodged; where the ſtraw nearly reſembled that round the barbery; but the grain on that part, though lodged, was much heavier than it was on this, where the crop ſtood erect.

The grain of the crop, in general, was thin-bodied; nevertheleſs, ten grains, choſen impartially out of the ordinary corn of the piece, took twenty-four of the barberied grains, choſen equally impartially, to balance it; ſo that, ſuppoſing the crop in general to be worth five pounds an acre, the part injured by the barbery would barely be worth forty ſhillings; the quality, as well as the quantity, being much inferior.

BARING *of trees. See the article* ABLAQUEATION.

BARK, the exterior part of trees, ſerving them for a ſkin or covering

Dr. Agricola ſays, that the bark of a tree may be compared to the ſkin of an animal, which is deſigned for the preſervation of the inward parts. It is generally of a ſpongy texture, and communicates with the pith, by a multiplicity of ſmall fibres paſſing between the capillary tubes, of which the wood conſiſts; ſo that the roots having imbibed the proper nutriment of the tree, it is carried up by the warmth of the ſun, through the fine arterial veſſels of the tree to the top of it; and being there condenſed by the cold, it returns by its own gravity down by the veſſels which lie between the wood and the inner bark, which perform the office of veins; and as it paſſes by, leaves ſuch part of its juices as the texture of the bark will receive, and requires for its ſupport.

Some are of opinion, that the ſoft whitiſh rind, or ſubſtance which lies between the inner bark and the wood, performs the office of veins; and ſome call this a third bark, ſuppoſing it to differ from the other only in having its fibres cloſer; adding, that this is the part which contains the liquid ſap, gums, &c. found in plants during the ſpring and ſummer months, and which hardening by degrees, is imperceptibly conveyed into the woody part of the tree, forming every year a new circle of wood between the bark and the trunk. Theſe circles are not equally thick, that circumſtance depending on the fertility of the year.

The bark of trees in general, and eſpecially that of the oak, contains a very rich ſalt, extremely uſeful in vegetation. One load of oak bark laid in a heap and rotted, after the tanners have uſed it for dreſſing their leather, will do more ſervice to ſtiff cold land, and its effects will laſt longer, than two loads of the richeſt dung. Mr. Miller ſays it is much better for cold ſtrong land, than for light hot ground, if it be uſed alone, as taken from the tan-yard; becauſe it is of a warm nature, and will looſen and ſeparate the earth ſo effectually, that, by only uſing it two or three times, a ſtrong ſoil, not eaſy to be wrought, will be rendered perfectly light and looſe: but by mixing it with earth of a nature contrary to that which it is intended to correct, and in a proportion ſuited to the nature of the ſoil it is to be laid on, it will prove a fine manure for almoſt any land; its ſalts being ſuch as will always fertilize the ground. Mr. Mortimer aſſerts, that it will alter and change the very nature of the ſoil, and turn it into a very rich black mould. *Mortimer's Huſbandry, vol.* I. *p.* 121.

It neceſſarily abounds in vegetable parts, derived from the tree to which it once belonged; and cannot but be ſtrongly impregnated with animal juices, as it lies a long time in the tan vats, with the ſkins and hides of animals; circumſtances which muſt render it ſingularly beneficial to all poor lands.

If laid on graſs, it ſhould be ſpread ſoon after Michaelmas, that the winter rains may waſh it into the ground: for if it be laid on in the ſpring, it will be apt to burn the graſs, and, inſtead of improving, will do it a conſiderable injury for that ſeaſon. When uſed for corn land it ſhould be ſpread before the laſt ploughing, that it may be turned down for the fibres of the corn to reach it in the ſpring; for if it lies too near the ſurface it will forward the growth of the corn in winter; and in the ſpring, when the nouriſhment is chiefly wanted to encourage the growth of the plants, it will be ſo nearly conſumed, that the corn will receive very little advantage from it.

Mr. Bradley tells us, that he adviſed a gentleman, to whom a conſiderable quantity of bark was left upon the expiration of the leaſe of a tan-yard, to lay ſome of it upon a piece of ſtubborn four land, which he did with ſuch ſucceſs, that his product was admired by all the gardeners and farmers in the neighbourhood. For ſuch ground, he thinks it ſhould be mixed with a ſandy ſoil; and that one third of bark to two thirds of ſand, will be a very ſufficient proportion for clays; laying on about one hundred and fifty cart loads upon an acre. *Bradley's Huſbandry, p.* 90.

All barks or rinds of trees, though not of ſo high a value as that of the oak, which is the ſort principally uſed by tanners, muſt of neceſſity enrich either corn or paſture ground, if broken into ſmall pieces, and laid upon it. They muſt needs be much richer than the mould or earth, uſually found in the bodies of old, large, hollow, willow-trees, though this is juſtly eſteemed very efficacious. *Worlidge's Huſbandry, p.* 84.

For the manner of making hot-beds with tanner's bark, *ſee the article* Tan.

BARK-BOUND, a diſeaſe common to fruit-trees, and may be cured by making a ſlit through the bark, from the top of the tree to the bottom, in February or March; and if the gaping be pretty conſiderable, fill up the rift with cow-dung. *Mortimer's Huſbandry, vol.* II. *p.* 85.

BARKING *of trees*, the operation of ſtripping off the bark or rind, particularly that of the oak, for the uſe of tanners.

It is neceſſary in our climate to perform this operation in the month of May, becauſe at that ſeaſon only, the bark is, by the great quantity of ſap, eaſily ſeparated from the wood. This alſo renders it neceſſary to fell the trees in that month; but by this method the timber is much leſs valuable than it would be, if felled after the fall of the leaf.

Mr. Marſhall, in his Rural Economy of Yorkſhire, ſays, the peeling of oak timber in that county is generally done by the day; the labourers being, I believe, invariably employed by the timber-merchant, not by the tanner; practices which are productive of a conſiderable ſaving of bark. Men working by the ton or the quarter, or tanners paying by weight or meaſure, will not peel the boughs ſufficiently near; it is againſt their intereſt to do it. But it is the intereſt of the timber-merchant, or of the tanner, if he purchaſe by the groſs, or by the ton of timber, to peel ſo long as the bark will pay for the labour. This accounts for the ſmallneſs of the twigs which are peeled in this country: if the bark run freely, twigs not much thicker than the finger are frequently ſtripped.

The tool commonly made uſe of, in ſome counties, is of bone. The thigh or ſhin-bone of an aſs are preferred, formed into a two-handed inſtrument for the ſtem and larger boughs, with an handle of wood fixed at the end. The edge once given by the grinding-ſtone, or a raſp, keeps itſelf ſharp by wear.

The method of drying bark in this country is generally the common one of ſetting it in a leaning poſture againſt poles lying horizontally, on forked ſtakes. But in a wet ſeaſon, or when the ground is naturally moiſt, it is laid acroſs a line of topwood, formed into a kind of banklet, raiſing the bark about a foot from the ground. By this practice no part of the bark is ſuffered to touch the ground: and it is, perhaps, upon the whole, the beſt practice, in all ſeaſons and ſituations. He then ſtacks or houſes it; and generally ſhaves and chops it ready for the tan-pit; ſelling it to the tanner at ſo much a quarter.

This cuſtom appears to be founded on a falſe baſis: the tanner is, or ought to be, the beſt judge of the mode of preparation, and the operation ought to paſs under his eye.

The practice of grinding bark does not ſeem to have yet got footing in this diſtrict: whenever it does, it will of courſe bring the preparation of bark into its proper channel.

The medium price of chopt bark, is 10*s.* 6*d.* a quarter.

BARLEY, a ſpecies of grain well known in England, and of which Mr. Miller has enumerated four ſpecies.

1. The ſpring barley, which has a double row of beards or awms ſtanding erect. This is the ſort principally cultivated in England, and of which the farmers make two ſorts, viz. the common, and the rath-ripe barley: but theſe two ſorts are in reality the ſame; for the rath-ripe is only an alteration of the common barley, occaſioned by being long cultivated upon warm gravelly lands. The ſeeds of this, when ſown in cold or ſtrong land, will, the firſt year, ripen near a fortnight earlier than the ſeeds taken from ſtrong land, and therefore the farmers in the vales generally purchaſe their ſeed barley from the warm lands; for if ſaved in the vales two or three years, it will become full as late in ripening as the common barley of their own product: on the other hand, the farmers on the warm land are alſo obliged to procure their ſeed barley from the ſtrong land, otherwiſe their grain would degenerate in bulk or fullneſs, which, by this change, is prevented. This ſort of barley is eaſily diſtinguiſhed by the two orders of beards or awms, which ſtand erect; the rind is alſo much thinner, and therefore eſteemed better for making malt.

2. The long-eared barley, which is cultivated in many parts of England, and is an exceeding good ſort; but ſome farmers object to this barley, becauſe they ſay the ears being long and heavy, it is more apt to lodge. This ſort of barley hath its grains regularly ranged in a double row, lying over each other, like the tiles on a houſe, or the ſcales of fiſh. It has no beards or awms; but its rind is very thin, and therefore eſteemed for making malt.

3. The ſprat barley, called alſo Battledore, Fulham, and Putney barley, from the great quantities cultivated in the neighbourhoods of thoſe places, has ſhorter and broader ears than either of the former ſorts; the awms or beards are longer, which tend greatly to preſerve it from the birds, and the grains placed cloſer together. This ſeldom grows ſo tall as the other ſpecies; the ſtraw is alſo coarſer, and therefore not ſo good fodder for cattle.

4. The winter barley, called alſo ſquare-barley, bear-barley, or big, is ſeldom cultivated in the ſouthern parts of England; but in the northern counties, and in Scotland, it is the general ſort ſown, as being much hardier than the other ſpecies. There are two ſorts of this barley, the one with four rows of grains, and the other with ſix, the latter of which is commonly diſtinguiſhed by the name of barley-big. The grain is large and plump, but the rind or chaff of it being thicker than that of either of the preceding ſorts, it is leſs eſteemed for making malt, and therefore not cultivated in the ſouthern parts of England, where the ſorts which are ſo much better for that purpoſe thrive ſo well.

Both the four and ſix rowed barley are generally ſown in the autumn, nearly at the ſame time with wheat, not only in temperate climates, but alſo in very cold countries; their hardineſs being ſuch as to bear the winter's froſts, even in the mountainous parts of the northern regions. In hot countries they are ſown in January, February, and March.

All the other ſorts are ſown in the ſpring of the year in a dry time: in ſome very light land, barley is ſown early in March, but, in ſtrong clay ſoils, not till April, and ſometimes not till the beginning of May; but when it is ſown ſo late, if the ſeaſon does not prove very favourable, it is very late in autumn before it is fit to mow, unleſs it be the rath-ripe ſort, which is often ripe in nine weeks from the time of ſowing: though Mr. Liſle is of opinion, that this, in particular, ought to be ſown early, for otherwiſe it will grow very thin. He likewiſe thinks that it ſhould be ſown on better ground than the other barley, becauſe as it ripens in a ſhorter time, it may be naturally ſuppoſed to exhauſt the nutritive juices of the earth faſter than other corn. But it is ſaid by others, that theſe nutritive juices in almoſt any tolerable ſoil, will probably hold out long enough to feed a crop of ſo ſhort a ſtanding as this is, though they might not ſuffice for corn which ſhould remain longer upon the ground; and it is added, that about Patney in Wiltſhire, they ſow the pooreſt ſandy ground with rath-ripe barley. *Liſle's Huſbandry, vol.* I. *p.* 271.

Mr. Liſle adds, that he himſelf, in the year 1707, ſowed in Hampſhire, rath-ripe barley in very poor white ground, and ſome of the ſame corn in good ſtrong clay land. No rain fell to bring it up till June; after which there were frequent ſhowers, and plenty of rain till harveſt. His rath-ripe barley in the poor land was miſerably bent, broken in the ſtraw, and harled, or fallen down. In the ſtrong clay land, the ſame corn ſuffered the ſame injuries, though in a leſs degree: but the ſtraw and leaves of the rath-ripe barley in both places blighted, and were full of black ſpecks; their ears were thin, and their colour was loſt; while the plants of late-ripe barley in an adjacent field were free from theſe ſpots, and ſtood upright with good ſtrength. From this experiment he infers, that ſince the clay land in the hilly country of Hampſhire, though in good heart, cannot, even in a moiſt year, ſufficiently feed the ſtraw of rath-ripe barley, ſo as to enable it to ſtand upright, but ſuffers it to be languid and withering, this ſort of corn is not proper for ſuch places, and that it is better to ſow late-ripe barley, even though three or four horſes extraordinary be provided againſt ſowing time, in order to get the corn into the ground a week before May begins. *Liſle's Huſbandry, vol.* I. *p.* 272.

Another important obſervation made on the ſame occaſion, by the ſame judicious farmer, was, that one half of the ſeed which fell deep came up without rain, while the reſt did not ſprout till after the rain came. The half which came up firſt, could not, by reaſon of the weakneſs of the ſtems, wait for the ripening of the latter edge-grown corn, in the ſame field; but its ſtraw bent, broke, and was entangled, and the ears buried themſelves among the broad clover ſown with the barley, ſo that he was forced to cut it, not being able to ſtay a week or ten days longer for the edge-grown corn to ripen: whereas the late-ripe barley ſtood ſo upright in its ſtraw, that the corn which came up firſt would ſtay ten days for the edge-grown corn.

The ſame gentleman had another evident proof, in the year 1706, that the ſtraw of the rath-ripe barley is thinner and weaker than that of the late-ripe. All his rath-ripe barley, of which he ſowed fifty acres in different ſorts of ground, are ſome of it ſide by ſide with late-ripe barley, crumpled down in the ſtraw, while the late-ripe barley of the ſame forwardneſs and growth ſtood upright.

Upon the whole, Mr. Liſle, after obſerving farther, that, if the ground be good, and the year a feeding one, rath-ripe barley is apt to run rank, and to fall while very green in the ear, which occaſions the grain not to fill; concludes, in regard to this ſort of corn, that it ſhould always be ſown early, that the land ſhould not have a north expoſure, and that the ſoil in which it is planted ſhould be pretty good, either naturally ſuch, or rendered ſo by art; “for we know, ſays he, that the poorer the ground is, the weaker and poorer the ſtraw will be in all ſorts of corn; and if the rath-ripe barley has by nature a weaker and thinner ſtraw than the late-ripe barley, and on that account is apter to crumple, to bend down, and to break in the ſtraw before it is ripe, much more will it be apt to do ſo, when the ſtraw is made much thinner and weaker than naturally it would be by the poverty of the ground it is ſown in. It is very evident to me, that rath-ripe barley ought not to be ſown on poor ground, and much leſs ſo in caſe it lies declivous from the ſun towards the north.” *Liſle's Huſbandry, vol.* I. *p.* 273, 274.

“Common barley ſown once in the burning ſand at Patney in Wiltſhire, will, for many years after, if ſown on indifferent warm ground, be ripe two or three weeks ſooner than any other, which has never been impregnated at Patney: but if ſown a degree farther north, on cold clayey land, will, in two or three years, loſe this quality, and become as late-ripe as any other. Indeed, Patney is far from improving the ſpecies of barley, except we think it improved by becoming more weak and tender, and ſhorter lived; which laſt mentioned quality fits it for ſuch countries, where the ſummers are too ſhort for other barley to ripen.

“Barley is far from being improved by becoming rath-ripe; for it loſes more good qualities than it gets by being ſown at Patney. It is ſo tender, that if it be ſown early, the froſt is apt to kill it: or if it be ſown late in May, on the ſame day, and in the ſame ſoil, with the ſame ſort of barley that is not rath-ripe, it will be much thinner bodied than the late-ripe. And beſides, if it happens to have any check, by cold or drought, it never recovers it, as the other doth, at what time ſoever it is ſown. It is now, as I am informed, gone out of faſhion, and very few farmers have ſown it of late years.

“I know a little pariſh, that I believe formerly loſt about two hundred pounds a year, by ſowing rath-ripe barley. But long and dear experience hath now convinced them of their error, and obliged them totally to diſuſe it.” *Tull's Huſbandry, p.* 115, 233, 234.

The middle-ripe barley, as Mr. Liſle calls it, meaning the common ſpring barley, bears late ſowing, even upon ground declivous from the ſun, better than the rath-ripe ſort; but not near ſo well as the late-ripe, or common long eared barley; nor will its ſtalk ſtand ſo long. Mr. Liſle was convinced from experience, that late-ripe barley will endure being ſowed when the ground is wetter than will do for the rath-ripe ſort, and that a bottom ground, or vale pent in between two hills, though ſhaded by one of them from the ſun, will, by means of the warmth and cloſeneſs of the air, often ripen corn as faſt as the ground that lies declivous to the ſun. In a field which he ſowed with the common ſpring barley, the loweſt part of which laid on a flat, ripened regularly, and even ſooner than another part of the ſame field which lay upon the ſide of a hill declivous to the ſun: but on that ſide of the ſame hill which ſloped from the ſun, the corn was more edge-grown, lay backward, and neither looked ſo white, nor was it ſo ripe. *Liſle's Huſbandry, vol.* I. *p.* 275.

The land which lies both very dry and healthy, and in which both mellowneſs and lightneſs are joined to a proper ſtrength of ſoil, is that which produces the beſt body, and thinneſt rinded barley; qualities which always recommend this grain, eſpecially to the maltſters. Such generally is the barley of the growth of the hilly countries. But poverty of ſoil is by no means requiſite in land, in order to its producing a plump and thin rinded barley; though it is allowed, that poor land which lies dry and warm, will bear better corn of this kind, than rich land in a cold and wet ſituation; for barley does not ſtand ſo much in need of ſtrength in the land, as of the healthineſs and warmneſs of the ſoil; though both are beſt where they can be had. *Liſle's Huſb. vol.* I. *p.* 281.

With regard to the choice of ſeed barley, it is neceſſary to obſerve, that the beſt grain for ſowing is that which is not blackiſh at the tail, nor has a deep redneſs, but is of a pale lively yellow colour, intermixed with a bright whitiſh caſt, and if the rind be a little ſhrivelled, it will be ſo much the better; for that ſlight ſhrivelling occaſioned by its having ſweated in the mow, is a ſure indication that its coat is thin. The huſk of thick rind barley being too ſtiff to ſhrink, will lie ſmooth and hollow, even when the inſide flour has ſhrunk from it.

The neceſſity of a change of ſeed from time to time, by ſowing that of the growth of a different ſoil, is no where more evident than in the culture of this grain, which otherwiſe becomes coarſer and coarſer every year. But at all times in this, as well as in all other grain, the utmoſt care ſhould be taken that the ſeed be full bodied.

Mr. Liſle tells us, that in order to be ſatisfied of this, he took out of a heap of barley ſixty grains, of different ſizes, viz. twenty of the biggeſt, twenty of the middle ſize, and twenty of the ſmalleſt corns. Twenty of each ſort of theſe grains he planted in three pots, each filled with the ſame ſort of mould, which was very rich. In eight or nine days time thirteen of the fulleſt bodied grains were come up, nine of the middle ſized, and only five of the ſmalleſt, and the plants of the plumpeſt corn exceeded thoſe of the others, both in colour and breadth of blade. In three days after, he found nineteen blades of the largeſt ſort come up, ſeventeen of the middle ſize, and thirteen of the ſmalleſt; and in three drys more, the blades of the beſt and of the middle ſort were all come up, while only ſeveenteen of the worſt had ſprouted, with ſuch manifeſt diſadvantage in colour and ſtrength in theſe laſt as plainly ſhewed that many of them would not have come up at all in poor ground. *Liſle's Huſband. vol.* I. *p.* 283.

It is natural to ſuppoſe that barley will, like wheat, be benefited by being ſteeped before it be ſown; for as rain cannot be depended upon ſoon after the ſowing of ſpring corn, there is ſurely an equal reaſon for extending the practice of theſe ſorts of grain, as well as to thoſe which are ſown in autumn. Liming indeed may hurt barley, if hot wheather ſhould ſoon follow after the ſowing, but a little ſprinkling of ſoot bids fair for improving it, at leaſt it will prevent the inſects from preying upon the ſeed. The rev. Mr. Elliot informs us, that a farmer who was obliged to attend other buſineſs in the courſe of the morning, ſowed oats at break of day, and harrowed them in before ſun-riſing. The conſequence was, that the corn thus early ſown, out-ſtripped the other oats ſown on the ſame day after the ſun was up, had larger ears, and appeared every way better, though the ſpot in which they grew was the worſt part of the field. If the dew, when buried with the corn, had this effect, it is reaſonable to ſuppoſe that a much greater would have been produced, had the ſeed been ſown in the evening, left all night to have been ſoftened with the dew, and then harrowed-in in the morning. *Elliot's Eſſay on Field Huſbandry, p.* 29.

Mr. Liſle alſo tells us, that a maltſter in Hampſhire having taken lands in the beginning of May, and no barley being to be had, he, by the perſuaſion of his malting-ſervant, made uſe of barley he had wetted, and was juſt well chitted or ſprouted; this corn came up well, and produced as good a crop as any ſown that year. *Liſle's Huſbandry, vol.* I. *p.* 284.

Barley is generally ſown either after a fallow, or on an erſh or ſecond crop. If after a fallow, the land muſt be ploughed at leaſt three times; and at the firſt ploughing, it ſhould be laid in ſmall ridges, and in that manner remain during the winter for the froſt to mellow it: but if another ploughing can be given it in January, or in the beginning of February, the ground will be ſtill much better broken and prepared. In March theſe ridges are ſplit, the ground is well harrowed, and laid as ſmooth as can be, and, if poſſible it is plowed again the ſame day, in order to ſow. But in ſtrong wet lands, the beſt way is to lay it round, and make deep furrows to receive the water.

Some at the time of twifallowing in June, make the land very fine, and ſow it with turneps, which they feed ſheep with in the winter: and in March they plough it up, and order it as before; but others who take this method of ſowing turneps, give it only one ploughing in March, juſt before they ſow.

Thoſe who ſow barley upon an erſh, after wheat, plough up the wheat ſtubble in as dry weather as they can, as ſoon as the time of ſowing wheat is over, which is generally about the beginning of October, and lay three ridges into one, if they have dung to ſpread upon it: but if they have not, they plough it in ſmall ridges, as before directed, that it may be the drier, and be the better mellowed by the froſt: they then plough it up again in March, and order it as before. Some farmers injudiciouſly ſow their barley after oats, in which caſe, neither of theſe three ploughings ought by any means to be neglected; and the land will be in much better order if the firſt of them be given in October: or, if the harveſt be early, the weather dry, and the huſbandman can poſſibly find time to do it, he will improve his ground ſtill more, by ploughing it up before he ſows his wheat, juſt as haveſt is in: this will be half as good as a ſummer's fallow. But all years will not admit of this practice. *Mortimer's Huſbandry, vol.* I. *p.* 131.

Some ſow their barley on ſmall ridges, and others on broad lands; the latter cannot be laid too round.

Mr. Mortimer relates, that a farmer in Eſſex, who lived near a market-town, from whence he had good quantities of dung, uſed to ſow his land with barley and clover; reaped the corn at harveſt, fed the clover all the winter, and from ſpring till the middle of July, when he fallowed his ground. In the next ſpring he ſowed it again with barley and clover, and repeated every year this method, by which he had large crops. His land was a rich light mould, ſomewhat inclining to a gravelly bottom. *Mortimer's Huſbandry, vol.* I. *p.* 132.

A correſpondent of the editors of the Muſeum Ruſticum, obſerves, that a few years ago he ſowed twenty-five acres of land, in fine tilth, with broad clover and barley; but the ſpring being backward and cold, and the ſummer wet, the clover got too forward, and overpowered the barley At harveſt they were both cut together; and the clover being full of juice, occaſioned its being a tedious time before the barley could be houſed. When he got it into the barn, the men complained much of its threſhing ſo badly, that they could not undertake to do it unleſs he would double the price to them: as this could not be afforded, he ordered them to give it only a light beating, leaving the under corn in the ſtraw, together with the clover, for the cattle.

By this means he loſt half his crop by the clover; and what barley could be obtained was lean, and thin-bodied, fetching but a very indifferent price at market.

As this was not the firſt loſs of the ſame kind he had experienced, he was determined, if poſſible, to find out ſome remedy; and accordingly applied to a very intelligent farmer in the neighbourhood, who adviſed him to ſow his clover, for the future, a month after the barley, by which means it would not prove too rank. This advice he accordingly followed, and found it anſwer extremely well; and has therefore, to his great advantage, continued the practice ever ſince. He adds, that there is no danger of the clover failing, though the ſeaſon ſhould prove dry; and that the ſeed is to be ſcattered on the ground without any farther care, there being no occaſion to harrow or roll it; for the ſmall blades of the barley will keep moiſture enough in the land to ſupply the ſmall wants of the clover during its infant growth, and when the barley is off, it thrives ſurprizingly. *Muſeum Ruſticum, vol.* III. *p.* 315.

Mr. Marſhall, in his Minutes of Agriculture, ſays, that in a dry ſummer early-ſown barley has a great advantage; but, perhaps, except the ſoil be very clean indeed, the opportunity of an April fallow ought not to be miſſed.

It has been already obſerved, that the uſual time of ſowing is in March, April, or the beginning of May. It is generally thought moſt adviſeable to ſow light lands the earlieſt, and to embrace the firſt dry ſeaſon that offers for doing it; dry weather being beſt for moſt ſummer corn. Clayey grounds, and lands ſubject to weeds, are thought to produce the beſt crops when ſowed late. Mr. Mortimer ſays, that barley will do well when ſown even about the middle of May, if the ſeed has been properly ſteeped. *Mortimer's Huſb. vol.* I. *p.* 132.

The common method is to ſow the barley ſeed with a broad-caſt at two ſowings; the firſt being harrowed in once, the ſecond is harrowed until the ſeed is buried; the common allowance of ſeed is four buſhels to an acre: but if the farmers could he prevailed upon to alter this practice, they would ſoon find their account in it; for if a third part of that quantity ye ſown, there will be a much greater produce, and the corn will be much leſs liable to lodge, as I (ſays Mr. Miller) have many times experienced; for when corn, or any other vegetables, ſtand very cloſe, the ſtalks are drawn up weak, and thence incapable of reſiſting the force of the winds, or ſupporting themſelves under heavy rains: but when they are at a proper diſtance, their ſtalks will be more than twice the ſize of the other, and therefore are ſeldom laid. I have frequently obſerved in fields where there has been a foot-path through their middle, that the corn, which has ſtood thin on each ſide of the path, hath ſtood upright, when all the reſt on both ſides has been laid flat on the ground; and whoever will give himſelf the trouble to examine theſe roots near the path, will find them tiller out (*i. e.* have a greater number of ſtalks) to more than four times the quantity of the other parts of the field. I have ſeen experiments made by ſowing barley in rows acroſs divers parts of the ſame field, and the grains ſown thin in the rows, ſo that the roots were three or four inches aſunder in the rows, and the rows a foot diſtant; the intermediate ſpaces of the ſame field were at the ſame time ſown broad-caſt in the uſual way; the ſucceſs was this: the roots which ſtood thin in the rows tillered out from ten or twelve, to upwards of thirty ſtalks on each root, the ſtalks were ſtronger, the ears longer, and the grains larger than any of thoſe ſown in the common way; and when thoſe parts of the field, where the corn was ſown in the uſual way, has been lodged, theſe parts ſown thin have ſupported their upright poſition againſt wind and rain, though the rows have been made not only lengthways, but acroſs the lands, in ſeveral poſitions; ſo that there could be no alteration in regard to the goodneſs of the land, or the ſituation of the corn: where therefore ſuch experiments have been made, and always attended with equal ſucceſs, there can be no room to doubt which of the two methods is moſt eligible, ſince if the crops were only ſuppoſed to be equal in both, the ſaving two thirds of the corn ſown is a very great advantage, and deſerves a national conſideration; as ſuch as a ſaving, in ſcarce times, might be of very great benefit to the public. This ſaving of ſeed-corn muſt be underſtood to regard ſuch as is ſown broad-caſt; for if it be ſown in drills, an eighth part of the ſeed uſually ſown will be ſufficient for an acre of land, and the produce will be greater; for all ſorts of corn are naturally inclined to ſend out ſeveral ſtalks from each root, which they rarely fail to do where the roots are at a proper diſtance, and have room; nor do ſtalks grow in this caſe near ſo tall, but are much ſtronger than when they are near together, when they rarely have more than two or three ſtalks; whereas thoſe roots which have proper room, ſeldom have leſs than ten or twelve. I have had eighty ſtalks upon one root of barley, which were ſtrong, produced long ears, and the grain was better filled than any I ever ſaw grow in the common method of huſbandry, and the land on which this grew was not very rich; but I have frequently obſerved on the ſides of hot-beds in the kitchen gardens, where barley ſtraw has been uſed for covering the beds, that ſome of the grains left in the ears have dropped out and grown, the roots have produced from thirty to ſixty ſtalks each, and thoſe have been four or five times larger than the ſtalks ever arrive at in the common way; but to this I know it will be objected, that although upon rich ground in a garden, theſe roots of corn may probably have ſo many ſtalks, yet in poor land they will not have ſuch produce; therefore unleſs a greater quantity of ſeeds be ſown, the crop will not be worth ſtanding, which is one of the greateſt fallacies that can be imagined; for to ſuppoſe that poor land can nouriſh more than twice the number of roots in the ſame ſpace as rich land, is ſuch an abſurdity, as one could hardly ſuppoſe any perſon of common underſtanding guilty of; and yet ſo it is: for the general practice is to allow a greater quantity of ſeed to poor land, than for richer ground, not conſidering that where the roots ſtand ſo cloſe, they will deprive each other of their nouriſhment, and conſequently ſtarve themſelves, which is always the caſe when the roots ſtand cloſe, which any perſon may at firſt ſight obſerve in any part of the fields where the corn happens to ſcatter when they are ſowing it; or in places where by harrowing, the ſeed is drawn in heaps, thoſe patches will ſtarve, and never grow to a third part of the ſize as the other parts of the ſame field; and yet, common as this is, it is little noticed by farmers, otherwiſe they ſurely would not continue their old cuſtom of ſowing. I have made many experiments for ſeveral years in the pooreſt land, and have always found that all crops, which were ſown or planted at a greater diſtance than uſual, have ſucceeded beſt upon ſuch land; and I am convinced if farmers could be prevailed upon to quit their prejudices, and make trial of this method of ſowing their corn thin, they would ſoon ſee the advantage of this huſbandry. *Miller's Gard. Dic.*

It is a common practice in ſome parts to ſcatter the dung of pigeons, poultry, &c. over barley and other corn, after the corn is ſown; but if this method be purſued, care ſhould be taken to ſcatter the dung immediately; becauſe then the ſhoot will eaſily make its way through: but when laid on later, it burns up, and eats the blades of the young plants. *Mortimer's Huſbandry, vol.* I. *p.* 133.

It too often happens from unfavourable weather, and an extremely dry ſpring, that it is impoſſible by the common method to break the clods, and prepare the ground ſufficiently for ſowing barley; in which caſe it has been the uſual method to break the clods with a large beetle called, from its uſe, a clotting-beetle. But this being a very chargeable and tedious method of preparing land, induced the ingenious Mr. Randall of York, to conſtruct an inſtrument, which he calls a ſpiky roller, by the aſſiſtance of which a large quantity of land may, in ſuch a dry ſeaſon, be ſoon reduced to an exceeding fine tilth, with very little trouble. The reader will find a full account of this uſeful inſtrument, the manner of making and uſing it, together with a figure of the roller, under the article Spiky Roller.

After the barley is ſown and harrowed-in, the ground ſhould be rolled after the firſt ſhower of rain, to break the clods and lay the earth ſmooth; which will render it better to mow the barley, and alſo cauſe the earth to be cloſer to the roots of the corn, which will be of great ſervice to it in dry weather.

And alſo when the barley has been up three weeks or a month, it will be a very good method to roll it over with a weighty roller, which will again paſs the earth cloſe to the roots of the corn, and thereby prevent the ſun and air from penetrating the ground, which will be of ſingular ſervice in dry ſeaſons; and this rolling of it before it ſtalks, will cauſe it to tiller out into a greater number of ſtalks, ſo that if the plants ſhould be thin, this will cauſe them to ſpread ſo as to fill the ground, and likewiſe ſtrengthen the ſtalks. *Miller's Gard. Dict.*

If the corn grows too rank, as it is ſometimes thought to do in a wet ſpring, mowing is then much better than feeding it; becauſe the ſcythe takes off only the rank tops, but the ſheep feed upon all indifferently; nor ſhould they even in any caſe be left upon it too long, becauſe being particularly fond of the ſweet end of the ſtalk next the root, they will bite ſo cloſe as to injure the future growth of the plant.

Barley is ripe when the red roan, as the farmers call it, meaning a reddiſh colour on the ear, is gone off, when the ears droop and fall, as it were, double againſt the ſtraw, and the ſtalks have loſt their verdure. If it be full of weeds it muſt lie in the ſwarth till they are dry. It is not apt to ſhed; but in wet weather it will be apt to ſprout or grow muſty; and therefore every fair day after rain it ſhould be ſhook up and turned; and when it is tolerably dry, let it be made up into cocks; but be ſure never to houſe it till thoroughly dry, leſt it mow-burn, which will make it malt worſe than if it had ſpired in the field. The common produce of barley is two or three quarters upon an acre. *Mortimer's Huſbandry, vol.* I. *p.* 133.

Mr. Liſle ſays, that poor thin barley and oats ſhould be cut a little ſooner than if the ſame plants were ſtrong and vigorous; for that the ſtraw, when the plants are full ripe, will not ſtand againſt the ſcythe. In this caſe the barley, in particular, muſt lie in ſwarth till it is thoroughly dry. Some of his barley, which lay out in ſwarth five or ſix days in very fine weather, though both blighted and edge-grown, grew plump, and acquired very near as good a colour as the beſt. He reckons ſhort ſcythes the beſt for mowing lodged or crumpled corn, becauſe they miſs the feweſt plants; and obſerves that a bow upon the ſcythe which carries away the ſwarth before it, is preferable to a cradle, the fingers of which would be pulled to pieces by the intangled corn, in drawing back the ſcythe. *Liſle's Huſbandry, vol.* I. *p.* 335.

Mr. Du Hamel tells us, that a farmer at Acou, obſerving that the chief hopes of more than common ſucceſs by means of the New Huſbandry, were founded on the frequent ſtirring of the ground while the corn was in it, and on allowing each plant ſufficient ſpace to extend its roots, and thereby collect the more nouriſhment, tried an experiment which appeared to him very proper to diſcover whether the effect would anſwer. He carefully cultivated a grain of barley, which grew by chance in his vineyard. This plant, ſaid he, ſtands diſtant from any other: it can extend its roots every way; it is in a rich ſoil, and cannot want for food: by joining frequent culture to theſe advantages, this plant of barley, according to theſe principles of the New Huſbandry, ought to yield a ſurpriſing increaſe. His reaſoning was juſt, and the experiment confirmed it; for this ſingle grain of barley produced two hundred ears, and about thirty ſtalks which had no ears. Some of the ſtalks were four feet high, and moſt of them three. Mr. Du Hamel counted twenty-four grains in a middling ear. Thus one grain, planted in a good ſoil, and well cultivated, produced 4800 grains; and the ſtraw of this ſingle plant of barley made of itſelf a ſheaf. *Tranſlation of Du Hamel's Huſb. p.* 113.

We have already obſerved, under the article Soap Ashes, that ſir Hugh Platt, by ſpreading that manure over his land, had a ſurpriſing crop of barley, the plants of which were of a prodigious ſize. An ear of this barley is delineated in its natural ſize, Plate III. fig. 1.

Mr. Young, in his Annals of Agriculture, vol. VII. gives the following experiments by Mr. Macro on early and late ſowing of barley: on Nov. 16, 1785, "I began this experiment by ſowing two buſhels of barley, which I harrowed-in, on clover land that had been folded the ſame as for the wheat; this firſt ſowing, therefore had only one earth. The barley came up about a week ſooner than the wheat, by the ſide of it, which was ſown the ſame day, and was exceedingly flouriſhing till the firſt ſharp froſt ſet in, which damaged the blade, but did not ſeem to affect the root. As near the middle of December as the weather would permit, I ſowed two buſhels more, on exactly the ſame quantity of ground, and ſo on about the middle of every month, till the month of May, 1786. This, and every ſowing after had two earths, one caſt, or half the ſeed, was ploughed-in, and the other half harrowed-in; all the land was folded alike in the month of November. The ſecond ſharp froſt, killed ſome of this ſowing, (I ſhould think moſt likely of the harrowed-in caſt) and a good deal of that ſown in November, but they both, with that ſown in January, ſeemed to ſuffer ſtill more, by the ſharp cutting winds in the month of March, when there was no ſnow to cover the blade; and it was injured by the froſt, the ſowings in February and March, loſt few, if any of their plants, and what was ſomewhat remarkable, were both forward enough to be harveſted on the ſame day, with the three preceding ſowings. That ſown in April, was full a fortnight later, and that ſown in May, there not being any ſo late ſown in the neighbourhood, was entirely deſtroyed by vermin.

As I ſome years before intended trying the ſame experiment, but was diſappointed of knowing the event by the ſtupidity of my workmen, I determined this time to prevent any miſtakes by mixing the different parcels in the barn, to threſh enough of the different ſowings in the field, to ſatisfy me, which was the moſt profitable crop, and accordingly attended the threſher the whole day myſelf.

As it was not at all neceſſary for the experiment, to thraſh the whole crop, I took three ſwaths of each ſowing, twelve yards in length, on the loweſt part of the land, where I thought the ſoil was the moſt equal through the whole of the experiment, which I ſhould have ſaid before, were by the ſide of each other, on the ſame piece of land. I had every parcel dreſſed and put into a ſack by itſelf as ſoon as threſhed, and the account ſtands thus:

	Pecks.	*Qrs. P.*	*Pints.*		*Coombs.*	*Buſhels.*	*Pecks.*	*Quarts.*
From that ſown in November, 72 ſq. yds.	3	—	—		12	2	1	—
December	3	—	1	or,	12	3	$1\frac{3}{4}$	$1\frac{1}{2}$
January	3	1	—	per acre.	13	—		—
February	2	3	2		11	2	$2\frac{1}{4}$	—
March	2	2	2		10	3	$3\frac{3}{4}$	1
April	2	—	2		8	3	$2\frac{1}{4}$	1
May	0	0	0		0	0	0	

This ſowing, as I obſerved above, was entirely deſtroyed by the rooks, I believe it had not been ſown more than three days before they began to ſcrape and pick it up, and compleatly devoured it.

It was the ſame with the very early ſowings, but that I expected, and was guarded againſt. This, however, may ſerve as a leſſon to young farmers, that although early ſowing may in moſt caſes be profitable, yet, it will not anſwer in large open fields, where lands are intermixed, unleſs neighbours ſow at the ſame time, for if only one farmer ſows early, he had need have as many keepers as he has pieces of land.

The barley of all the ſowings was of the Zealand ſtock. On the ſame piece of land that I tried the above experiments, which is a deep ſand, value about 6 or 7 ſhillings per acre, I tried two others, one about ten years ſince, with chalk from different pits, ſome of them a dry chalk, and others greaſy: I carried only one load of each ſort, and laid it about the thickneſs of 70 loads to an acre. Not one of them did the leaſt good, for I could not tell by any of the crops ſince, without looking at the ſoil where they were laid. The other was by deep ploughing, in the autumn of 1785 (when I ſowed part of the piece with wheat) by going with a ſecond plough after the firſt for one ſteatch only) and raiſing about three or four inches of ſoil that had never been turned up before; and on viewing it about Midſummer, I could not find where it was; by any difference in the crop, nor could ſee that the barley ſown in January was the beſt crop. By the ſame rule, when I began to try the experiment before, that ſown in February was the beſt, as it appeared ſo on view, I remember, all the ſummer.

Mr. Marſhall, in his Rural Economy of the Midland Counties, ſays the long-eared barley, and the ſprat barley are the chief cultivated in thoſe parts. The latter is the old ſtock of the country, the former of late introduction, of not more than fifty years ſtanding. The ſprat is deemed more hardy, and requires to be ſown more early; the long-eared to be the better yielder. The ſprat is thought by maltſters to make the beſt keeping beer; the long-eared to be freer, to operate quicker, both in the malt-houſe and the cellar. In ordinary practice barley ſucceeds wheat. Where turneps are grown, it precedes that crop: of late years it has been ſown with ſucceſs on turf. The time of ſowing, if the weather permits, the latter end of April or beginning of May. The quantity of ſeed, two buſhels and a half or three buſhels an acre. The method broadcaſt, moſtly above, but ſometimes, if the land is got very fine, the ſeed is plowed under. If the harrow, in adjuſting, leaves any clods unreduced on the ſurface, they are broken with the clotting beetle by women, &c. and if any twitch be pulled up in harrowing, it is ſhook out looſe, with forks, and left on the ſurface to wither. The produce is generally extraordinary large, ſeven quarters an acre is no unuſual crop; eight have been grown.

In his Rural Economy of Gloceſterſhire, he ſays, in the Cotſwold hills the common long-eared barley is the only ſpecies, which is ſown the latter end of March or beginning of April. The quantity of ſeed, three buſhels an acre, produce generally from twenty buſhels to four quarters an acre. In the vale of Gloceſterſhire it is made uſe of on every years lands as a clearing crop. It is harveſted looſe, mown with the naked ſcythe, lies in ſwath till the day of carrying, and is cocked with common hay-forks. The quantity of the vale barley is ſuch as recommends it to the maltſter, in preference to hill barley, that affords a more ſightly ſample. But there ſeems to be a quality in the ſoils of theſe vales which gives ſtrength and richneſs to every article of their produce.

In his Rural Economy of Norfork, he ſays the moſt prevailing and almoſt only ſpecies of barley ſown in that diſtrict, is the common long-eared barley, for which the ſoil is peculiarly well adapted, and whoſe barley is coveted for ſeed throughout the kingdom. In the grand routine barley ſucceeds wheat and turneps, and in ſome very light land farms it is ſown inſtead of wheat after the ſecond year's lay after wheat; the ſtubble having been trampled down with bullocks at turneps, and wheat-ſeel being finiſhed, the farmer begins to "ſcale in his wheat ſtubbles" for a winter fallow for barley. If the land lie in narrow work, the ridgelets are ſplit; if in warps, the ground is likewiſe plowed clean, but very fleet. The beginning of March, the land is harrowed, and preſently after the farmer "takes up his wheat ſtubbles" by a full-pitch croſs-plowing; or, if the ſeaſon be wet and the ſoil heavy, he reverſes the ridges. In April he harrows, and begins "ſtirring for barley," with another full-pitch plowing, lengthway; generally gathering the ſoil by this plowing, either into five-pace, or into ten-pace warps; in which it lies until ſeed-time, when it is harrowed, rolled, ſown, plowed fleet, reverſing the warps, and "ſlading down" the furrows, ſo as to render the entire ſurface as even and level as may be.

After turneps, the ſoil is generally broken up as faſt as the turneps are got off; if early in winter, by rice-balking; if late, by a plain plowing. The general practice, if time will permit, is to plow three times; the firſt fleet, the ſecond full-pitch, the laſt a mean depth; with which laſt the ſeed is plowed in.

The Norfolk farmers, in general, are maſters of the art of cultivating barley. They ſeem fully aware of the tenderneſs of this grain in its infant ſtate; and of its rootlings being unable to make the proper progreſs in a compact or cold ſoil: they therefore ſtrive by every means to render the ſoil open and pulverous.

Nor is this caution confined to "turnep-barley," but is extended more or leſs to "ſtubble-barley;" which, however, does not require ſo great a degree of care; the ſoil in this caſe being kept open, in ſome meaſure, by the undigeſted ſtubble, and the roots of graſſes and other weeds, which a turnep-fallow is or ought to be free from. Barley is ſeldom manured for, except when ſown after lay, when it is treated as wheat. After turneps, no manure can be requiſite; nor after wheat, if this has been manured for: if not, the turnep crop following immediately, the barley is left to take its chance; unleſs the opportunity be embraced for winter marling.

Notwithſtanding the dryneſs of the Norfolk ſoil, barley may be ſaid to be ſown late in this diſtrict. There is little ſown before the middle of April, and the ſeed-time ſeldom cloſes until towards the middle of May. The time of ſowing, however, depends in ſome meaſure on the ſeaſon; which, with reſpect to ſowing barley, is more attended to in Norfolk than perhaps in all the world beſide. Until Linnæus hit upon the idea of ſowing by the foliation of trees, the republic of agriculture never heard of any other guide to the time of ſowing than the almanack, which is ſtill followed implicitly in every diſtrict in this kingdom, except Norfolk.

No inſtance either of fortifying it againſt diſeaſe, or of ſteeping it to forward its vegetation in a dry ſeaſon, or a backward ſeed-time. This is ſtrong evidence, though not a proof, that ſteeping ſeed-barley with intent to promote its vegetation, has no beneficial effect.

In this county, barley is all ſown broadcaſt, and almoſt all under-furrow; that is, the ſurface having been ſmoothed by the harrow and roller, the ſeed is ſown and plowed under with a ſhallow furow: a circumſtance this, which, until obſerved in Norfolk, had never occurred to many, either in practice or theory, though admirably adapted to a light dry ſoil; and, indeed, to any ſoil which is light enough to produce good barley; provided it be rendered ſufficiently fine, and the ſeed be not buried too deep.

Barley, like wheat, is generally ſuffered to ſtand until it be very ripe. It is univerſally mown into ſwaths, with a ſmall bow fixed at the heel of the ſcythe. Cradles are not in uſe; and the north country method of ſetting it up in ſinglets is unknown. Three buſhels an acre may be taken as the neareſt medium quantity of ſeed-barley. If barley receive wet in the ſwath, it is treated in a ſingular method in Norfolk. It is not turned, but "lifted:"—that is, the heads or ears are raiſed from the ground, either with a fork or the teeth of a rake; thereby admitting the air underneath the ſwath. This method of lifting is thought to ſtop the ears from vegetating nearly equal to that of turning, which requires more labour, beſides breaking and ruffling the ſwaths, which, by repeated turnings, loſe their ſtiffneſs, becoming weak and flabby, and liable to fall into cloſe contact with the ground; in which ſtate the corn preſently begins to ſprout.

Mr. Marſhall, in his Rural Economy of Yorkſhire, ſays that the long-eared barley and the big or four-rowed barley, generally called the winter-barley, are the ſpecies uſed in that county. The firſt in the vale when the ſeaſon of ſowing is driven very late. The winter barley is new to the diſtrict; and it does not ſeem to be yet generally underſtood that it ought to be ſown in autumn.

One circumſtance reſpecting the ancient huſbandry of this crop deſerves to be regiſtered, as it ſerves to ſhew the alteration which time has the power of making, even in the buſineſs of huſbandmen.

Leſs than a century ago, I believe, barley was not ſaleable until it was malted. Public malt-houſes, and the buſineſs of a maltſter were equally unknown: every farmer malted his own barley, or ſold it to a neighbour who had a malt kiln.

Now, even public malt houſes are unknown, the entire buſineſs of malting being in the hands of profeſſional maltſters, who buy the barley of the farmer, and ſell him the malt he may want for his own private uſe.

BARN, a covered place or houſe for laying up any ſort of grain, hay, or ſtraw.

Every farm ſhould be furniſhed with barns proportioned to the quantity of corn it produces, which will be a great advantage to the farmer. The barns ſhould have a dry ſituation, and be properly placed in the farm-yard, but not quite contiguous to the houſe, for fear of fire.

A barn is uſually made of wooden frames covered with planks of oak, or built of brick or ſtone, which ever the country affords in the greater plenty; and in either caſe there ſhould be ſuch vent-holes, or openings, in its ſides or walls, as to afford free admittance to the air, in order to prevent the mouldineſs that would otherwiſe, from the leaſt dampneſs lodge in the corn. The gable ends may be always of brick or ſtone, for the ſake of greater ſolidity, and the whole may be roofed with thatch or tiles, as is moſt convenient. The ſize of the barn ſhould be proportioned to the crop uſually produced by the land to which it belongs. Two large folding doors ſhould face each other, one in each ſide of the building, for the convenience of carrying in or out a waggon-load of corn in ſheaves; and theſe doors ſhould be of the ſame breadth with the threſhing floor to afford the more light and air; the former for the threſhers, and the latter for winnowing. Over the threſhing floor, and a little above the reach of the flail, poles are often laid acroſs from one beam to another, to form a kind of upper-floor, upon which the threſher may throw the ſtraw or haulm, to make an immediate clearing, till he has time to ſtow it properly elſewhere: and on the outſide, over the great doors, it will be right to form a large penthouſe, made to project ſufficiently to cover a load of corn, in caſe a ſudden ſtorm ſhould come on before it can be houſed; and alſo to ſhelter the poultry in the farm-yard, in great heat, or bad weather.

It is moſt adviſable, and indeed moſt commonly practiſed in countries that abound in corn, to have a ſeparate barn for wheat, another for ſpring-corn, ſuch as barley and oats, and a third for peas, tares, lintels, clover, ſaint-foin, &c.

Some art, which muſt be the reſult of practice, is neceſſary in placing and piling up the ſheaves in barns. But it may not be uſeleſs to obſerve, that it is always neceſſary to preſs them as cloſe to the walls of the barn as poſſible, ſo as not to afford the leaſt room for rats, or other vermin to creep in between them: for if they once get admittance they will ſoon penetrate further, lodge themſelves in the mow, and do prodigious damage to the corn. Where this misfortune happens, the only remedy is to take down the mow, kill the vermin, and pile it up anew.

But the floor or threſhing place, is the principal part of every barn, and therefore the greateſt care ought to be taken in making it. In order to this, the ſurface of the intended threſhing place is dug away to the depth of about ſix inches, and the earth thus taken out, after being well cleared of ſtones, is mixed with the ſtrongeſt clay that can be procured, and with the dung of cows and oxen. This mixture is then worked together with water, till it is of the conſiſtence of ſtiff mortar, and the compoſt thus made is ſpread as ſmooth as poſſible with a trowel, upon the ſpot from whence the earth was taken. As it cracks in drying, it muſt be beaten down with great force; or rolled with a heavy roller till all the crevices are filled up: and this muſt be continued till it is quite ſolid, hard, and firm.

The beſt barn-floor, both for threſhing and for keeping corn, is that which is drieſt, ſmootheſt, moſt completely ſolid, and conſequently freeſt from cracks and holes, in which inſects and vermin may ſhelter themſelves, and even breed. The ancients were remarkably careful in this reſpect, as we learn from Cato, Varro, and Columella, the laſt of which excellent huſbandmen relates particularly the great pains they took, firſt to dig up the ground to ſome depth, in order to moiſten it with freſh lees of oil, but not with any that had ſalt in them; then to mix it thoroughly with chaff, and ram it down as cloſe as poſſible; afterwards as it dried, to ſtop all the cracks and crevices that appeared, to continue beating it down with great force, to render it quite level; and laſtly, to ſtrew it again with chaff, which they trod in, and then left it to be completely dried by the ſun. All theſe writers agree, that the lees of oil, thus uſed, prevent the growth of weeds in theſe floors, and contribute to preſerve the corn from being plundered by the mice and ants. Their barns were always ſeated high, and as dry as poſſible.

A floor made in the above manner muſt be greatly preferable to either ſtone, or the earthen floors, too common in many parts of England, and from which ſuch dampneſs has been communicated to the corn, as has rendered wheat, for example, ſixpence a buſhel worſe, either for keeping or exporting.

Boarded threſhing-floors, made of ſound, thick, well ſeaſoned planks of oak, are excellent for ſervice, will laſt a long time, and may be converted into good floorings for rooms, by plaining them down, after they are become too uneven for the purpoſe originally intended.

Mr. Young, in his Annals of Agriculture, vol. XVI. gives two plans for the conſtruction of barns; the firſt of which was ſent him by his correſpondent the reverend Mr. Roger Kedington, of Rougham in Norfolk; who ſays, "The mode of executing the work, I ſhould recommend as follows: let the underpinning be of brick or ſtone, two feet high above ground, and let the ſides be boarded: the roof of the barn will be beſt covered with reed or ſtraw, and thoſe of the ſtables with ſlate, or glazed tile; becauſe they muſt be more flat, and the water which runs from the roof of the barn, would injure moſt other coverings. At each end of the barn, and over the back door, ſmall doors four feet ſquare, ſhould be fixed, at the height of twelve feet from the ground; the two former for putting corn in at the ends, and the latter for filling the middle of the barn after the bays are full. All the bays ſhould have a floor of clay or marl, and the threſhing-floor be made with hard bricks, which will be ſufficient for all ſorts of grain, except wheat and rye; and for threſhing them it will be good œconomy to have planks of oak or red deal, well fitted together and numbered, to be laid down occaſionally, and confined by a frame at their ends. A barn built on ſuch a plan would hold a great deal of corn, and be filled moſt conveniently: and if ſtacks of corn were built at each end, they might be taken in without any carting. If more buildings are requiſite, two may be added on the backſide like the ſtables in front; otherwiſe, if doors are made under the eaves on the backſide, as directed at the ends, and ſtacks be placed oppoſite to them (juſt far enough to avoid the eaves dropping), by placing a waggon between them and the barn by way of a ſtage, thoſe ſtacks may be taken in without carting; which method ſpares a great waſte of corn and much trouble. The ſpars of the roofs of the ſtables reſt upon the upper ſills of the ſides of the barn, and the outſide wall of the ſtable is eight feet high; the barn ſupplying the higheſt ſide and one end of each ſtable; and the ſtables in return are buttreſſes to the barn, and ſtrengthen it greatly.

A barn built of the dimenſions of the incloſed plan, with two ſtables, might, in this country, be built for the following ſum. The underpinning of the barn, three feet and a half high from the foundation, and a brick and half thick, will contain ſix hundred and fifty-two feet of brick work nearly. The underpinning of the ſtables, one brick thick and three feet high from the foundation, will contain one hundred and forty-four feet, the whole amounting nearly to three rods of brick work; which, at 8l. per rod, amount to 24l. The threſhing floor contains fifty-ſix yards; and may be paved with hard white bricks, laid edge-ways, for 8l. 8s. It will be proper to make an underpinning on each ſide of the threſhing-floor two feet in depth and one brick thick, to prevent vermin from burrowing under it; and this, added to the underpinnings firſt mentioned, will not exceed three rods of brick-work; ſo the total expence of the threſhing floor and the underpinning will be 32l. 8s. The frame of the barn, with two ſtables complete (allowing the beams, poſts, ſills, ſtuds, and principal ſpars to be of oak, and the ſides to be covered with featheredge boards, of red-wood deal), would coſt 200l.; and 50l. more would be required for the reed and ſlating of the roofs. The iron work for hinges, cramps, nails, &c. would amount to another 10l. and a ſmall additional expence would be highly proper for paint, or ſome cheaper compoſition, to preſerve all the wood, that is expoſed to the weather. The workmanſhip is included in the whole of the above eſtimate, which you may obſerve is altogether very near 300l. *See Plate* II*.

Mr. Young has given a plan for another barn as follows:

“The mere ideas of theory in making propoſitions to aſſiſt others (even the youngeſt of beginners) I have a very poor opinion of, and I would not venture to recommend the idea I have of a good barn to the reader's eye, if I had not for ſome time experienced the great convenience reſulting from this arrangement; it is true, that my barn having been built many years, and in ſome reſpects very aukwardly placed, I had it not in my power to convert it into ſuch a regular deſign as is in the power of thoſe who build all new; but I have in my additions all the curcumſtances of the ſheds and their connection with the barn as here repreſented.

To arrange buildings of this nature conveniently is of prodigious importance to cattle, ſheep, and hogs; and alſo to ſaving expences in labour and in waſte of hay, ſtraw, &c.

It is proper to note, reſpecting the ſize of this barn, that the plan was ſketched in conſequence of a requeſt from general Waſhington, that I would ſend him my idea of a good barn, and the neceſſary adjuncts, proportioned to a farm of 500 acres. The threſhing floor of this barn is large enough for three men to work in, who can in a winter threſh corn of ſuch a farm; and all ſummer threſhing is to be condemned when from any other motive than that of having ſtraw for litter.

The new invented machines for threſhing would alter very much the plan of a barn; where they are uſed, they ſhould be built in the center, and the corn ſtacks ſo diſpoſed around as to ſupply the machine without the uſe of cart or horſe: than which nothing is more eaſy to contrive. The barn in ſuch caſe is a mere receptacle for ſtraw, and ſhould be contrived with a view to its diſtribution.

I have ſeen very expenſive barns in Ireland, which the owners have boaſted would confine a mouſe;—ſo much the worſe: there cannot be too much air all around: the ſides, for this reaſon, ſhould be neither of brick nor ſtone, unleſs (which would be very difficult) the whole was a ſyſtem of arches for being perfectly pierced with apertures of the form of a ſmall ſegment of a large circle: tunnel brick, which I have ſeen let into the walls, are always far too few to do good, and the common air holes are nothing. The beſt barns (for corn) are of boards; and the more air thoſe boards admit, the better will the ſtraw be for the cattle; and the brighter the ſample of corn in a tickliſh ſeaſon.

Combine this fact with Hendon farmers, where the beſt hay perhaps in England is made, never putting it in any ſort of building, always in ſtacks.

It will be remarked, that there is no proviſion for water; I am much in doubt whether there ought to be, fattening cattle on dry food alone excepted. But for all young cattle, of whatever age, cows, &c. I much prefer their being unchained twice a day and walked or led to the mouth of a neighbouring pond; the reaſon is, the cattle are by this means brought up in habits of being conſtantly gentle and quiet; and not apt to be frightened or ſkittiſh when put to fattening or the dairy, which is an object of much more conſequence than the value of the labour. Water conducted in pipes or troughs freezes during much of the winter, and is then a nuiſance; and for all beaſts on turneps or cabbages none is wanting. The expence alſo of making theſe conduits is a very great addition to the building; and the labour of pumping not to be forgotten.

In this opinion I go againſt the Herefordſhire vaunted practice; but their ſyſtem does not at all meet my ideas; and the expence of giving every bullock room enough to turn around to go and drink adds ſo greatly to the extent of building as puts it out of the queſtion for any perſons but gentlemen on their own farms.

No notice is here taken of a hoggery, which is an important object; but I am apt to think, after much experience (for I once built a moſt complete one, the plan of which I have inſerted in this work), and much reflection ſince, that it ſhould be in a diſtant part of the farm, the carriage of food, more eſpecially for fattening, is nothing to that of dung; and having all the dung of a farm of 300 to 500 acres accumulated at one place (very rarely the centre) is a moſt expenſive circumſtance. In a large, or in a breeding ſyſtem, a ſmall cottage for a truſty ſervant muſt be added, to watch ſows and pigs, but the expence would not be large.

The ſame obſervation is applicable to a ſtanding ſheep fold or yard; in this caſe it is eſſential that the ſhepherd's dwelling ſhould be cloſe, and even looking into it, but not the door opening into it. The way ſhould be circuitous, to keep women and children from diſturbing the flock.

All theſe points muſt vary according to peculiar views or circumſtances of a farmer and his farm, and even neighbourhood: but they are very important and much deſerve attentive conſideration.

EXPLANATION. 1, 2, 3, 4, 5, 6. The barn.

1, 2, 7, 8. The porch of ditto with a ſmall door, at 9.

10, 11. The great door in at which the carts enter with corn.

12. The threſhing floor which extends the ſpace of 1, 2, 10, 11.

13, 13. Bays, in which the corn is ſtowed.

14, 14, 14, 14. Sheds, for cattle, oxen, and horſes.

15, 15, 15, 15. Mangers, two feet broad, out of which the cattle eat their ſtraw and chaff, and turneps, carrots, cabbages, potatoes, &c.

16, 16, 16, 16. Paſſages, between two and three feet wide, for carrying ſtraw from the threſhing floor to feed the cattle.

17, 17, 17, 17. Doors into the paſſage.

18, 18, 18, 18. Principal poſts on which the ſheds reſt.

19, 19, 19. Gutters for conveying the urine of the cattle to.

20, 20. Ciſterns, out of which it is every day thrown on to dunghills, placed regularly within reach.

From the mangers 15 to the gutters 19, there is a pavement of bricks upon a ſlope, ſo laid as to finiſh ſix inches perpendicular above the gutter, and which pavement is ſix feet broad from that edge to the manger. The gutters are from 18 to 20 inches broad.

21, 21, 21, 21. Are ſheds for various uſes. If a dairy is kept, and one or two of the ſheds, 14, appropriated to cows, one of theſe ſheds will do for calves, alſo for chaff, turneps, roots, &c. in caſe of froſts, &c.

22, 22. Two yards each, with a ſhed for ſhelter, to be applied to any purpoſe wanted; one for ſheep, ſurrounded with low racks, and the other divided for a horſe or two looſe, if wanted; the other half for yearling calves, which do better in a farm-yard than ſtalled.

23, 23. Incloſure of walling or pales.

If one of the yards be applied for hogs, then one of the ſheds, 21, will be uſeful for their appurtenances.

1, 2, 8, 3, 4, 5, 6, 7. The main body of the barn which riſes 14, 16, or 20 feet to the eaves.

All the reſt are ſheds placed againſt it, being the cheapeſt way of covering cattle that has yet been diſcovered.

I ſhould add, that I have this general idea executed in my own farm, though not ſo complete as here ſketched, becauſe not built at once, and that I find it perfectly convenient.

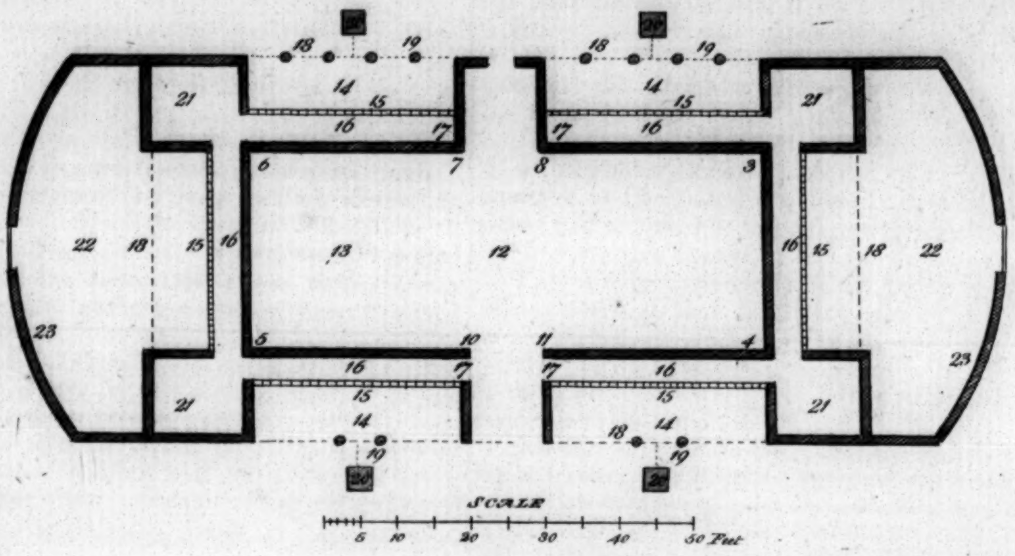
Should the quantity of cattle to be kept be greater than here admitted, a circular ſhed ſhould be erected fronting the door 9, and the hay ſtacks muſt be diſpoſed conveniently near thoſe ſheds appropriated for cows, horſes, or fat cattle. Corn ſtacks muſt be built on the contrary ſide of the barn if other circumſtances allow.

Mr. Marſhall, in his Rural Economy of Norfolk, ſays, the barns of Norfolk are ſuperior to thoſe of every other county; numerous and ſpacious. No farm has leſs than three threſhing-floors; ſome farms five or ſix, and theſe of unuſual dimenſions. Twenty-four feet by eighteen is conſidered as a well-ſized floor; twenty by fifteen, a ſmall one. Indeed, a floor of leſs dimenſions is ill adapted to the Norfolk method of cleaning corn; which is univerſally effected by caſting it with ſhovels from one end of the floor to the other. To obtain this neceſſary length of floor, a porch, on one or both ſides of the barn, is almoſt univerſal. A lean-to porch, with double doors to let out an empty waggon, and with a range of lean-to ſheds or hovels on either ſide, continuing the roof of the barn, without a break to the eaves of the porch and ſheds, is at preſent, deſervedly, in good eſtimation.

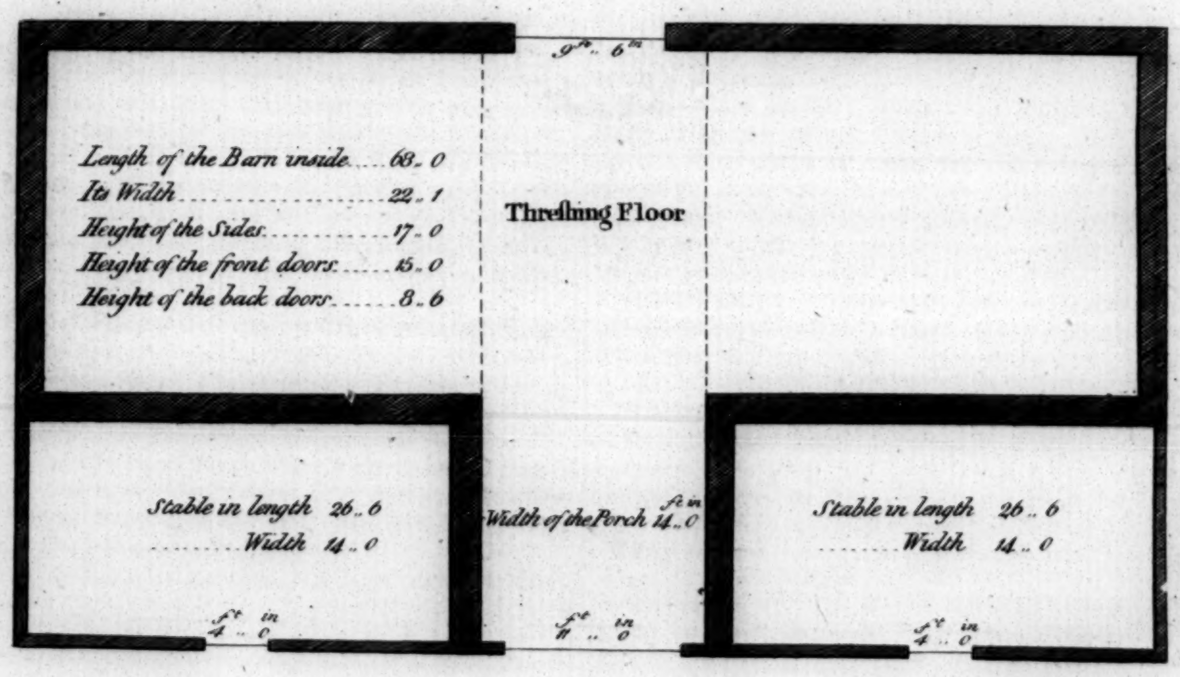
Barn-floors are of plank, “lumps” (a kind of bricks), or clay: the laſt are moſt prevalent; and although they be conſidered as inferior to the firſt, they are in better eſteem in Norfolk than in moſt other places.

It is obſervable, that notwithſtanding the ſpaciouſneſs of the Norfolk barn-floor, the labourers in general object to their threſhing two in a barn: rather chooſing to work ſingly:—this, perhaps, is principally owing to the particular method of threſhing with two on a floor; which is, to turn their backs on each other; working as ſeparately as if they

PLAN of a BARN and CATTLE-SHEDS.



A BARN and STABLES


9ft. 6in.
Length of the Barn inside ..... 68 .. 0
Its Width .... 22 .. 1
Height of the Sides .... 17 .. 0
Height of the front doors .... 15 .. 0
Height of the back doors .... 8 .. 6
Threshing Floor
Stable in length 26 .. 6
.... Width 14 .. 0
Width of the Porch ft. in 14 .. 0
Stable in length 26 .. 6
.... Width 14 .. 0
ft. in 4 .. 0
ft. in 11 .. 0
ft. in 4 .. 0

BRITISH MUSEUM

they threſhed on ſeparate floors: the method of ſtanding face to face, and giving ſtroke for ſtroke, being ſeldom if ever uſed.

In his Rural Economy of the Midland Counties, he ſays, "The only thing noticeable in the barn of this diſtrict, is an improvement, lately introduced I believe, in the means of ſupporting the roof. Inſtead of beams and principals, partial partition walls are raiſed, on either ſide the floor and between the bays, to take the purlines; leaving an opening, or large doorway, in the middle of the building, to admit the corn.

In a capital barn where two pair of purlines were neceſſary, the cheeks of walling are narrow; not more than five feet wide; receiving the lower purlines only; with ſhort beams and principals, reſting on the tops of the cheeks or partial partition walls, to ſupport the upper ones.

This mode of conſtruction is cheaper than oak beams; takes the weight of the roof in a great meaſure off the ſide walls; and frees the body of the barn from beams (well known nuiſances in filling a barn); yet ſtiffens the building. On each ſide the floor, theſe partial partitions are evidently eligible, on theſe and various other accounts; without any evident diſadvantage.

Barn floors. In this diſtrict, a peculiar method of laying wooden barn floors is in practice. Inſtead of the planks being nailed down to ſleepers, in the ordinary way, the floor is firſt laid with bricks, and the planks ſpread over theſe, with no other confinement than that of being "dowled" together (that is ploughed and tongued) and their ends let into ſills or walls, placed in the uſual way, on each ſide the floor.

By this method of putting down the planks; provided the brickwork be left truly level; vermin cannot have a hiding place beneath them; and a communication of damp air being effectually prevented, floors thus laid are found to wear better, than thoſe laid upon ſleepers. It is obſervable, that the planks, for this method of laying, ought to be thoroughly ſeaſoned.

The ſame author, in his Rural Economy of Yorkſhire, ſays, "I obſerved here an entire farmery under one roof. One end occupied a ſmall dwelling, the ground floor of the remainder by a ſtable and beaſt-houſe; over which are a barn and hay-chamber; with a chamber-barn-floor: a thing I had not ſeen, nor conceived an idea of, before I obſerved it, in more inſtances than one, in this diſtrict.

The above-mentioned is the only one I have ſeen in a new erection: I have however had full opportunity of obſerving the uſe of another thrown over a cow-houſe; in a large old building which had long been uſed as a barn, ſtable, and beaſt-houſe.

The advantages of a chamber-barn-floor are dryneſs, cleanneſs from dirt carried in with the feet, and ſecurity againſt pigs, poultry, and other accidents to which ground-floors are more liable: for threſhing wheat upon, chamber-floors are obviouſly preferable to ground-floors; moſt eſpecially in low dirty ſituations.

No eſſential diſadvantage has yet ſtruck me reſpecting a chamber-threſhing floor; but with reſpect to a chamber-barn, there is one which is obvious; namely, that of having the corn at harveſt, a buſy ſeaſon, to raiſe one ſtory higher than ordinary.

Another idea in rural architecture, new to me as that of a chamber-threſhing-floor, I have ſeen executed in a ſubſtantial manner by two of the firſt occupiers in the vale; namely, a granary over a barn-floor.

In all other barns I have ſeen, the ſpace over the floor, whether this be large or ſmall, and whether the building be low or lofty, remains entirely uſeleſs except in one inſtance, in which a very ſpacious building having been converted into a barn, joiſts were thrown acroſs out of the reach of the flail, and the mows continued over the floor. The idea of occupying the lower part of this ſpace with a cattle-houſe, as well as that of filling the upper part of it with a granary, have perhaps been originally and recently ſtruck out in this country.

In the two inſtances in which I have ſeen granaries over barn-floors, the joiſts are ſupported by two beams thrown acroſs the building, and the flooring of the granary let into the walls at the ends; ſo that notwithſtanding the granaries may be ſurrounded with vermin, they are proof againſt them.

In the floor is a trap-door with tackle over it, to raiſe and lower the corn from and to the barn-floor.

The height between the floors thirteen feet. This in my opinion is too great a height. Ten feet high is the moſt the flail requires; and every inch above that height renders the granary in many reſpects leſs commodious.

Confining the duſt, which always riſes more or leſs in threſhing, appears to be the only objection to a barn-floor-granary: I mean in a barn with pitching-holes to houſe the corn at. But if ventilators were made immediately under the granary-floor, with valves to open or ſhut as the wind ſhould change, the health of the threſher would in all probability be leſs injured than it generally is by this laborious and unhealthful employment.

Indeed, in this country, where tall, wide folding barn-doors are grown into diſuſe, vent-holes of this kind are in ſome degrees neceſſary to every barn-floor. Even upon the Wolds, a corn country, the uſe of large doors is declining: ſome good barns have lately been built with common-ſized doors; one at each end of the floor: opening however in two parts, one above the other; ſo that the lower half can be ſhut to keep out pigs and poultry, while the upper one is opened to let in light and air.

This is a fortunate circumſtance for the owners of landed eſtates: folding-doors large enough to admit a load of corn are expenſive in the firſt inſtance, and frequently require repairs; beſides the threſhing-floor, be it of what material it may, being liable to great injury in the act of drawing loaded waggons upon it.

Indeed, throughout, the Yorkſhire-barn is characteriſed by economy. In Norfolk, barns of one hundred and fifty to two hundred pounds coſt are not unfrequently built: here a very convenient one, and ſuch a one as will ſatisfy a good tenant, may be built for forty or fifty pounds. What a ſaving is this upon a large eſtate!

In his Rural Economy of Glouceſterſhire, he obſerves that in that county, he alſo met with a granary over a barn-floor: the height about ten feet (juſt out of the reach of the flail); and with two inſtances of granaries over pitch-roof porches; a new idea, and a very good one. The corn is hoiſted up by tackle; and ſhot down through canvas tunnels into bags placed below.

"The ſize of barns, in this country, is above par. In height, above any I have obſerved. Fifty-two by twenty feet in the clear, and ſixteen to twenty feet high to the plate, is eſteemed a good barn. This ſize admits of four bays of ten feet each, with a floor in the middle. There are ſome remains of old monaſtery barns, of great ſize, in this diſtrict.—The height of modern barns may have ariſen from obſerving in thoſe that "one foot below the beams is worth two above."

Barn-floors are of a good ſize: 12 to 14 by 18 to 20 feet. The beſt of oak: ſome of ſtone: but a ſpecies of earthen floor which is made, here, is thought to be ſuperior to floors of ſtone, or any other material, except ſound oak plank. The ſuperior excellency of theſe floors is owing in part to the materials of which they are made; and in part to the method of making.

BARNACLES, horſe-twitchers, or brakes, are a ſort of inſtruments uſed by farriers to put upon horſes noſes, when they will not ſtand quietly, to be ſhod, blooded, or dreſſed.

There are ſeveral ſorts of barnacles, the common ſort are rollers of wood bound together, to hold the horſe's noſe between. Another ſort have handles, and are therefore termed pincers, to diſtinguiſh them from the foregoing. And a third ſort are held together at the top by a ring incloſing buttons, having the top buttons held by an iron pin rivetting through them.

BARREN CORN, a name given to a diſtemper in corn, by M. Aimen, who firſt obſerved it. The ears of wheat or rye, the ſpecies moſt ſubject to this diſtemper, which are thus affected, are long, lean, and white; in ſome the ſtamina, or ſmall threads in the middle of the flower, are dry, tranſparent and horned; the female organs are ſmall, whiter, and leſs velvetty, than in healthy ears: in others, the filaments are ſwelled, the apices, or knobs on the tops of the ſtamina, void of duſt or farina, and the ſtigmata badly unfolded. The ſtigmata of all the bloſſoms of an ear are ſometimes dried and parched; at other times the apices are ſwelled.

BARREN EARTH, a name given by ſome to the under ſtratum of earth, or that which lies below the ſtratum frequently turned up, and cultivated for the nouriſhment of plants.

This notion of the under ſtratum of earth being dead or barren, and will deſtroy every vegetable planted in it, ſeems to be founded on a miſtake: for every kind of earth, whether it be upon or under the ſurface, is certainly capable of giving nouriſhment to plants, provided it be for ſome time expoſed to the influence of the air, froſts, &c. in order to enable it to diſpenſe its nutritive qualities. An earth ſeemingly barren dug out of a deep pit, will, if ſpread on the ſurface, and properly ſtirred and expoſed, be ſoon in a condition of bearing plants, and even much more ſo than the earth, which having been long at the ſurface is almoſt exhauſted, by the number of vegetables it has ſucceſſively nouriſhed. The notion of any earth being barren, merely becauſe it is placed at a diſtance from the ſurface, is by the moſt intelligent naturaliſts exploded; its particles may perhaps want a proper arrangement, but it always poſſeſſes the vegetative quality. This opinion has been confirmed by repeated experiments; and a very remarkable one of this kind is related by a correſpondent of the editors of the Muſeum Ruſticum, vol. I. p. 100, &c. where the writer tells us that he planted a quantity of potatoes in a piece of what they called dead barren earth, the upper bed having been taken away and ſpread on the adjacent land. Yet in this ſpot of ground dug two ſpits deep by the help of ſpades and mattocks, and the earth broke as fine as poſſible, he had a prodigious crop of remarkable fine potatoes; though the earth had not been expoſed to the influence of the atmoſphere above two months, it being dug in February, and the potatoes planted the latter end of March.

Barren Springs, a name given by huſbandmen to ſuch ſprings whoſe waters are injurious to land.

Moſt waters that flow from coal-mines, or through beds of ſulphureous minerals, have this pernicious quality, deſtroying vegetables, inſtead of nouriſhing them. They have a harſh and brackiſh taſte, are generally of a reddiſh colour, and depoſit a reddiſh ſediment in the channel through which they flow. They are much better when they have run ſome diſtance, than at their firſt breaking out on the ſurface of the earth. *Mortimer's Huſbandry, vol.* I. *p.* 20.

BARS, the fleſhy rows that run acroſs a horſe's mouth, reaching almoſt to the palate. They are very diſtinguiſhable in young horſes.

BARTH, a warm place, or paſture for calves and lambs.

BARTON, *or* Barken, the yard of a houſe.

BASTARD *Alkanet*, called alſo *baſtard gromill*, or *ſalfarn*, a weed common among corn, eſpecially rye. It may be eaſily known by its red roots, which yield a red tincture, and are uſed by the young girls in Sweden to colour their cheeks. From the root uſually riſes a ſingle ſtem about a foot high, rough and branching out at the top. The flowers are ſmall and white, ſurrounded with five long, narrow, hairy leaves, forming what the botaniſts call the empalement of the flower cup, and ſucceeded by four white rough ſeeds. *See the figure of this plant on* Plate III fig 2.

BAVINS, bruſh-faggots, or faggots made with the bruſhwood at length.

BAUSON, the ſame with badger. *See* Badger.

BAY, a colour in horſes, ſo called from its reſembling the colour of a dried bay-leaf.

There are various degrees of this colour from the lighteſt bay to the dark, which approaches nearly to the brown, but is always more gay and ſhining. The bright bay is an exceeding beautiful colour, becauſe a bright bay horſe has generally a reddiſh daſh, with a gilded aſpect, his main and tail black, with a black or dark liſt down his back. The middle colours of bay have alſo frequently the black liſt, with black main and tail. And the dark bays have almoſt always their knees and paſterns black; and we meet with ſeveral ſorts of bays, that have their whole limbs black from their knees and hocks downwards. The bays that have no liſt on their backs, are, for the moſt part, black over their reins, which goes off by an imperceptible gradation from dark to light towards the belly and flanks. Some of theſe incline to a brown, and are more or leſs dappled. The bay is one of the beſt colours, and horſes of all the different kinds of bays are commonly good, unleſs when accidents happen to ſpoil them while they are colts. *Gibſon on Horſes, vol.* I. *p.* 44.

Bay *of a barn*, that part where the mow is placed. Hence ſuch barns as have the threſhing floor in the middle, and a ſpace for a mow on each ſide, are called barns of two bays, &c.

BAYARD, a bay horſe.

BEANS, a ſort of pulſe well known, and of which there are two ſpecies, diſtinguiſhed by the name of the garden-bean, and the horſe-bean.

Some few trials have been lately made in France to raiſe garden beans in open fields, on the principles of the new huſbandry: and the reſult of theſe experiments ſufficiently indicated that very large crops may be procured by that method if properly practiſed. M. du Hamel tells us, that M. Eyma planted, in December 1755, in a field near Bourdeaux, the common ſort of garden beans, in a middling ſoil not dunged, but thoroughly ploughed a foot deep. The rows were two feet aſunder, and the plants a foot diſtant from one another. Theſe beans, which every one thought too thinly ſown, being aſſiſted by frequent hoeings, yielded a greater crop than any in the common way. When they began to ripen, M. Eyma gave the ſpaces between them a good plowing, and on the twenty-third of June ſowed in each of them a row of red kidney beans, which came up very well. In a fortnight after he plucked up the garden beans, and gave the ground on which they ſtood a ſlight hoeing. Theſe kidney-beans proved the fineſt he ever ſaw. He repeated the ſame experiment in 1756, and was rewarded with ſuch ſucceſs as ſurpaſſed his warmeſt expectations. *Traité de la Culture des Terres, tom.* V. *p.* 81.

Purple BEANS, a kind originally brought from the Cape of Good Hope, had an experiment made on their prolificneſs in January 1775 by Mr. Marſhall, who had made it a piece of parlour furniture ſince the preceding harveſt. It had, when drawn, upwards of ninety pods, but ſome of them immature.

2	of the pods had	5	each	10 beans.
12	- - -	4	- -	48
37	- - -	3	- -	111
27	- - -	2	- -	54
7	- - -	1	- -	1
85 pods.				230 vegetative beans.

He put the fives and fours in a paper by themſelves; as he did the threes in a ſecond paper; and the twos and ones in a third paper, to try whether the ſeed which ſprings from the root was ſpecially fructuous, or was not, in itſelf peculiarly prolific, and whether the particular circumſtances of its production influenced its produce. In July, 1777, theſe beans were drilled indiſcriminately, in a patch of the ſame ſpecies; when the particular produce of the pods of different ſizes were identified by labelled ſtumps, and the experiments rigidly attended to: but at harveſt not the ſmalleſt diſparity could be diſcovered; for the bean brought forth ſingly was equally prolific with that brought forth in a pod of 4 or 5.

Mr. Marſhall recommends the pulling beans, for he ſays the benefit the ſoil receives will more than pay for the extra labour in clearing. Indeed they were liable to have lumps of dirt to adhere too large to be ſifted out, and too heavy to be blown out, nor did caſting them from one end of the barn floor to the other with a ſhovel remove it; but after ſeveral experiments, he put about half a buſhel into a ſack and threſhed them for a few ſeconds; they were then ſhook in a wheat-riddle, and came out perfectly clean. The flail breaks the clods, and the wheat-riddle lets the duſt and ſmall refuſe beans through it. In another experiment he approves of their being trod by a man as more expeditious. Another advantage ariſes from their being pulled, is, the ſtubbornneſs of the roots keeps the mow open, and admits a circulation of air. The quantity to be put into the ſack to be trod out ſhould be about two buſhels in a four buſhel ſack, and the expence about 7d. or 8d. a quarter. The ſame gentleman ſays in another place, that by experience he found that by pulling up by hand, is far preferable to cutting with ſickles: they may be pulled up faſter and much cleaner from weeds and graſs than when cut, beſides leaving the land in a ſtate greatly ſuperior. The waſte is leſs, as to loſe ſcarcely a bean; and the bean ſtalks are immediately ready to bind and ſet up; and by the roots lifting the earth from the ground, gives the air a free circulation. The work is alſo eaſier to the labourer, who ſtands more upright, and the power required is much leſs, eſpecially in dry weather. By ſtriking the roots of each handful againſt the foot, the mould is almoſt wholly diſengaged from the fibres. The ſoil in the drills, inſtead of being bound by the roots, and cumbered by the ſtubble, is left as looſe as a garden, and the ſurface free from obſtructions; and if thoroughly hoed is as fit as a fallow to be ſowed with wheat on one plowing.

Horſe Beans, delight in a ſtrong moiſt ſoil, and an open expoſure, for they never thrive well on dry warm land, or in ſmall incloſures, where they muſt, and are frequently attacked by the black dolphin fly: theſe inſects are often in ſuch quantities as to cover the ſtems of the beans entirely, eſpecially all the upper part of them; and whenever this happens, the beans ſeldom come to good; but in open fields where the ſoil is ſtrong, and the plants have room, this rarely happens.

Theſe beans are uſually ſown in land which is freſh broken up, becauſe they are of uſe to break and pulveriſe the ground, as alſo to deſtroy weeds; ſo that the land is rendered much better for corn, after a crop of beans, than it would have been before, eſpecially if they are ſown and managed according to the new huſbandry, with a drill plough, and the horſe-hoe uſed to ſtir the ground between the rows of beans, which will prevent the growth of weeds, and pulveriſe the ground, whereby a much greater crop of beans may, with more certainty, be expected, and the land will be better prepared for whatever crop it is deſigned for after.

The ſeaſon for ſowing beans is from the middle of February to the end of March, according to the nature of the ſoil; the ſtrongeſt wet ſoil ſhould always be laſt ſown. The uſual quantity of beans ſown on an acre of land, is about three buſhels, though this is double the quantity that need be ſown, eſpecially according to the new huſbandry; but it will be neceſſary firſt to ſet down the practice according to the old huſbandry, and then give directions for their management according to the new. The method of ſowing is after the plough, in the bottom of the furrows; but then the furrows ſhould not be more than five, or at moſt more than ſix inches deep. If the land be newly broken up, it is uſual to plough it early in the autumn, and let it lie in ridges till after Chriſtmas, then to plow it in ſmall furrows, and lay the ground very ſmooth. Theſe two ploughings will break the ground fine enough for beans, and the third ploughing is to ſow the beans, when the furrows ſhould be made ſhallow, as before mentioned.

Moſt people ſet their beans too cloſe; for as ſome lay the beans in the furrows after the plough, and others lay them before the plough, and plough them in; ſo by both methods the beans are as cloſe as the furrows are made, which is much too near: for when they are on ſtrong good land, they are generally drawn up to a very great height, and are not ſo apt to pod as when they have more room, and are of a lower growth. The better way, therefore, is to make the furrows three feet aſunder or more, which will cauſe them to branch out into many ſtalks, and bear in greater plenty than when they are cloſer; by this method leſs than half the quantity of beans will be ſufficient for an acre of land, and the air being admitted between the rows, the beans will ripen much earlier, and more equally than in the common way. *Miller's Gard. Dict.*

It has been already obſerved, that the black dolphin fly often deſtroys a crop of beans, and to prevent which a correſpondent of the editors of the Muſeum Ruſticum propoſes, that when theſe deſtructive inſects are firſt ſeen on the tops of the beans, one or more perſons, provided each with a ſcymetar or hanger, ſhould be ſent in the field, and ſtrike off the heads of the beans. He adds, that by this means a crop has been often ſaved, this fly being ſeldom known to riſe again when it once falls with the bean top to the ground. *Muſeum Ruſticum, vol.* III. *p.* 233.

Another correſpondent in the above work ſays, that as ſoon as the beans have got ſix leaves, the ſheep ſhould be turned in to feed among them; for they will eat up all the young weeds, even the melilot, without touching the beans. He adds, that the ſheep may be kept every day among the beans till they are in bloſſom; but they muſt not be ſuffered to lie down. *Muſeum Ruſticum, vol.* III. *p.* 339.

When beans are intended to be planted according to the new huſbandry, the ground ſhould be four times ploughed before the beans are ſet, which will break the clods, and render it much better for planting. Then uſe a drill plough, to which a hopper is fixed for ſetting the beans, the drills ſhould be made at three feet aſunder, and the ſpring of the hopper ſet ſo as to ſcatter the beans at three inches diſtance in the drills. By this method leſs than one buſhel of ſeed will plant an acre of land. When the beans are up, if the ground be ſtirred between the rows with a horſe-plough, it will deſtroy all the young weeds; and when the beans are advanced about three or four inches high, the ground ſhould be again ploughed between the rows, and the earth laid up to the beans; and if a third ploughing, about five or ſix weeks after be given, the ground will be kept clear from weeds, and the beans will ſtalk out, and produce a much greater crop then in the common way. *Miller's Gard. Dict.*

A correſpondent of the editors of the Muſeum Ruſticum, has given the following method of cultivating beans in the vale of Ayleſbury.

"Firſt, ſays he, I plough two furrows on each outſide of the land, but ſow no beans in them: I afterwards drill, with an inſtrument hereafter deſcribed, the three next furrows: then I plough two furrows without drilling any beans in them, and ſo on, ſowing three, and leaving two for intervals, till the land is finiſhed.

"When the beans are about two or three inches high, I plough two furrows up each interval, turning the furrows from the beans, ſo as to make a ridge in the middle of each interval. I have a little plough on purpoſe for this uſe, about half the ſize of a common plough, which is drawn by one horſe.

"This work ſhould be done after a rain. This year, 1764, on the fifteenth of May we had rain. I therefore went to plough in the intervals on the eighteenth, and continued at plough till all were finiſhed. On the eighth of June we had rain again. On the ninth of June I went to harrow the intervals with the triangular harrow hereafter deſcribed. About a week after that we had more rain. I then went to harrow again, going up the interval I went down before, and down that which I went up. This is what we call croſs-tining. Thus my land is laid quite ſmooth, kept clear from weeds, and the beans have a fine looſe mould to ſtrike their fibres into; and it is by far the cheapeſt way of weeding beans.

Proportions of the above DRILL (ſee Plate III. fig. 3.)

"Diameter of the iron wheel twenty inches.

"Length of the box from A to B, twenty inches.

"Breadth of the box from B to C, ten inches.

"Depth of the box from C to D, five inches and a half.

"Diameter of the cylinder of wood upon the iron axis of the wheel, four inches. This cylinder turns out the beans regularly.

"Length of the cylinder two inches and a half. On this cylinder are twenty-one holes, a quarter of an inch deep, and half an inch in diameter.

"E is a tongue, which drops upon the cylinder, and plays up eaſily: the tongue is half an inch thick, and three quarters wide. When a larger bean than ordinary comes, it will throw the tongue up, which naturally recovers its place again; and ſo the work goes on well and even. The tongue is repreſented ſeparately with its notch at E: the notch does not go quite through it; it falls exactly on the holes of the cylinder.

"A lid takes off to put the beans into the box, and buttons down at F."

The triangular HARROW *deſcribed* (ſee Plate III. fig. 4.)

"From A to B eighteen inches.

"The tines are nine inches a-part.

"The three tines in the croſs-bar are only three inches and a half a-part.

"E, a cock which plays upon a pin, in which are three holes to hang the whipple tree in. If you put it into the upper hole, the tines bear very heavy upon the ground: I generally uſe the middle hole." *Muſeum Ruſticum, vol.* III. *p.* 26.

When the beans are ripe they are reaped with a hook, as is generally practiſed for peaſe; and after having lain a few days on the ground, they are turned, and this muſt be repeated for ſeveral times, until they are dry enough to ſtack; but the beſt method is to tie them in ſmall bundles, and ſet them upright; for then they will not be in ſo much danger to ſuffer by wet, as when they lie on the ground; and they will be more handy to carry and ſtack, than if they were looſe.

The common produce is from twenty to twenty-five buſhels on an acre of land. *Miller's Gard. Dict.*

In the ſtiff, ſtrong land, of the vale of Ayleſbury, they annually ſow a great many acres of horſe-beans, all which they uſually mow with a bare ſcythe, in ſwarth, as they call it; that is they mow beans towards the beans; and each mower has a boy, who follows him with a fork, and lays the beans in wads. Their reaſon for mowing them in ſwarth, is on account of the largeneſs of their crops, and the beans leaning inwards; it is only when they have a thin crop, that they venture to mow them againſt their bending (this they call throatings;) for ſhould they do it in common, it would break the hearts of the mowers, being as hard work again as the other.

When they mow in ſwarth, the workmen always keep the points of their ſcythes downwards, or they would ſtrip off great quantities of the beans.

In Hertfordſhire alſo, ſome farmers mow their beans with a ſcythe, and a three ribbed ſtrong cradle: this cuts a great deal in a day, lays the beans in regular rows, and ſaves the expence of a wadder; but in Buckinghamſhire they cannot uſe a cradle, their crops being in general ſo heavy, that the workman could not carry over the ſwarth. *Muſeum Ruſticum, vol.* I. *p.* 275.

The beans ſhould lie in the mow to ſweat, before they are threſhed out; for as the haulm is very large, and ſucculent, ſo it is very apt to give and grow moiſt; but there is no danger of the beans receiving damage, if they are ſtacked tolerably dry; becauſe the pods will preſerve the beans from injury; and they will be much eaſier to threſh after they have ſweat in the mow than before; and after they have once ſweated and are dry again, they never after give.

By the new huſbandry the produce has exceeded that of the old by more than ten buſhels an acre; for if the beans cultivated in the common method are obſerved when they are in pod, it will be found that more than half way of their ſtems have no beans on them; for by ſtanding cloſe, they are drawn up very tall, ſo the tops of the ſtalks only produce, and all the lower part is naked; whereas in the new method, they bear almoſt to the ground; and as the joints of the ſtems are ſhorter, ſo the beans grow cloſer together. *Miller's Gard. Dict.*

Beans are a part of the diet of horſes, but chiefly uſed in mixture with bran or chaff, and by ſome upon the road, with oats; but they are moſtly given to coach horſes and others that are conſtantly in draught. They afford the ſtrongeſt nouriſhment of all other grain, and will enable horſes to go through a great deal of heavy labour; but in ſome ſeaſons they breed a kind of vermin, which the farmers call a red bug, and is reckoned dangerous, and therefore the beſt way at ſuch times is to have them well dried and ſplit, which may, in ſome meaſure, deſtroy the quality that is engendered in them. *Gibſon on Horſes, vol.* I. *p.* 171.

Mr. Marſhall, in his Minutes of Agriculture, recommends the rolling of both peas and beans as a good preparative to hoeing; at a time when they open a broad leaf, and lay flat on the ground; Indeed he trampled on them and rubbed ſome of the plants hard with his foot, and at the expiration of a week they had not the appearance of having received any injury; and he ſays that beans when their broad leaves lie flat on theground may be harrowed and rolled with ſafety.

Mr. Young, in the 2nd. vol. of his Annals of Agriculture, obſerves that the May beans are not ſubject to the grub as others are, and they are by much the beſt bearers. In another part of that valuable work in vol. VII. he experienced the great benefit of bean ſtraw in feeding lean cattle.

In the 5th vol. of the memoirs of the Bath ſociety of agriculture, page 39 is the following paragraph:

“ I have found, by repeated experience that beans are a much more hearty and profitable food for horſes than oats. Being out of old oats the two laſt ſprings, I ſubſtituted horſe beans in their ſtead. In the room of a ſack of oats with chaff, I ordered them a buſhel of beans with chaff to ſerve the ſame time. It very ſoon appeared the beans were ſuperior to the oats from the life, ſpirit, and ſleekneſs of the horſes.

Whoever has frequented the corn markets in London cannot but know that old horſe-beans ſell from ten to fifteen, and even more, per cent. dearer than new corn: becauſe new beans will, by their abundant crudity, give a horſe the gripes, and other diſorders equally fatal. To prevent ſuch conſequences, and at the ſame time ſave the difference between the expence of old and new corn, a correſpondent of the editors of the Muſeum Ruſticum tells us that he made the following experiment.

He purchaſed a quantity of new beans, and filled a large tub with them, pumping in as much water as was neceſſary to wet them: after ſoaking about ten hours he drew off the water, and laid the beans in a heap on the floor. In this manner he ſuffered them to continue till they began to heat, when he ſpread them out thinner, moving them often with a malt ſhovel, and letting them lie in beds till the germ ſwelled and became turgid. Then he carried them to a malt-kiln, and dried them gradually; and gave part of them to his horſes, as ſoon as cold.

By this preparation he aſſures us new beans will agree as well with cattle as any old corn that can be procured at the market.

The greateſt nicety in the operation is to prevent the beans from ſprouting, or malting, which would injure them, and not to dry them by too quick a heat. *Muſeum Ruſticum, vol.* I. *p.* 327.

BEAR, or *bere*, a ſpecies of barley, called alſo winter barley, ſquare barley, and big.

This grain is chiefly cultivated in Scotland, the northern parts of England, and Ireland. It yields a very large return, but is not eſteemed ſo good for malting as the common barley, for which reaſon it is very little cultivated in the ſouthern parts of England. *See* BARLEY.

BEARD, the ſame with awm. *See* AWMS.

BEARD *of a horſe*, a name given to the hairs ſcattered on his under lip to the place where the curb of the bridle reſts.

BEARDED *oat graſs*, the ſame with wild oats. *See the article Wild* OATS.

BEASTS of BURTHEN. See OXEN, and HORSES.

BEDS, a name given by many writers on the new huſbandry to the ſpaces occupied by the rows of corn; to diſtinguiſh them from the intervals, or open ſpaces between theſe beds, which they term alleys. *See* ALLEY.

Yellow ladies BEDSTRAW, *cheeſe-rennet, maid's hair*, or *petty mugwort*, a weed very common in moiſt meadows and paſture grounds. Its ſlender ſtalks riſe to about a foot in height. The leaves come out in whorls, eight or nine together. They are long, narrow, and of a green colour. Two little branches generally come out near the top of the ſtalk, ſupporting a conſiderable number of ſmall yellow flowers, conſiſting of one petal, divided into four parts, and ſucceeded by two large kidney-ſhaped ſeeds.

BEE, a ſmall and well known inſect, famous for its induſtry.

This uſeful and laborious inſect is divided by two ligaments into three parts or portions, the head, the breaſt, and the belly. The head is armed with two jaws and a trunk; the former of which play like two jaws opening and ſhutting to the right and left. The trunk is long and taper, and, at the ſame time, extremely pliant and flexible, being deſtined by nature for the inſect to probe to the bottom of the flowers through all the impediments of their chives and foliage; and drain them of their treaſured ſweets: but were this trunk to be always extended, it would prove incommodious, and be liable to be injured by a thouſand accidents, it is therefore of ſuch a ſtructure, that, after the performance of its neceſſary functions, it may be contracted, or rather folded up; and beſides this, it is fortified againſt all injuries by four ſtrong ſcales, two of which cloſely ſheathe it, and the two others, whoſe cavities and dimenſions are larger, encompaſs the whole. From the middle part or breaſt of the bee grow the legs, which are ſix in number: and at the extremity of the paws are two little hooks, diſcernible by the microſcope, which appear like ſickles, with their points oppoſite to each other. The wings are four, two greater and two ſmaller, which not only ſerve to tranſport them through the air, but, by the noiſe they make, to give notice of their departure and arrival, and to animate them mutually to their ſeveral labours. The hairs with which the whole body is covered, are of ſingular uſe in retaining the ſmall duſt that falls from the chives of the flowers, of which the wax is formed, as will be obſerved hereafter. The belly of the bee conſiſts of ſix rings, which ſlide over one another, and may therefore be lengthened or contracted at pleaſure; and the inſide of this part of the body contains the inteſtines, the bag of honey, the bag of poiſon, and the ſting. The office of the inteſtines is the ſame as in other animals. The bag of honey is tranſparent and cryſtal, containing the ſweet juices extracted from flowers, which the bee diſcharges into the cells of the magazine for the ſupport of the community in winter. The bag of poiſon hangs at the root of the ſting, through the cavity of which, as through a pipe, the bee ejects ſome drops of this venemous liquor into the wound, and ſo renders the pain more exceſſive. The mechaniſm of the ſting is admirable, being compoſed of two darts, incloſed within a ſheath that tapers into a fine point, near which is an opening to let out the poiſon. The two darts are ejected through another aperture, which, being armed with ſeveral ſharp beards like thoſe of fiſh-hooks, are not eaſily drawn back again by the bee; and indeed ſhe never diſengages them if the wounded party happens to ſtart and put her into confuſion; but if one can have patience to continue calm and unmoved, ſhe clinches thoſe lateral points round the ſhaft of the dart, by which means ſhe recovers her weapon, and gives leſs pain to the perſon ſtung. The liquor which at the ſame ſhe infuſes into the wound, cauſes a fermentation, attended with a ſwelling, which continues ſeveral days; but that may be prevented by immediately pulling out the ſting, and enlarging the puncture, to let the venomous matter have room to eſcape.

Let us now conſider the generation, polity, and labours of theſe inſects, the true knowledge of which is very much owing to the modern invention of glaſs-hives, through which all the ſecrets of the community are laid open to a curious obſerver. Any perſon who carefully examines a hive at different ſeaſons of the year, will diſtinguiſh three ſorts of bees; of which the far greater number are the common working bees, who do all the buſineſs of the hive, and ſeem to be neither male nor female. The working bees are repreſented on Plate III. fig. 5. The ſecond ſort, called drones, are the males, and ſomewhat larger than the former as fig. 6. They have no ſting, nor even ſtir from the hive, but live upon the honey prepared by the others. The third ſort is a much larger and longer bodied bee, of which there are often but one in every ſwarm or colony of young bees, who are from time to time detached from the hive in ſearch of another habitation. This largebee is what the ancients called the king, from the reſpect they always ſaw paid to it by other bees; but being the female, the moderns more properly give it the title of queen, ormother of the ſwarm. *See* Plate III. fig. 7.

When theſe induſtrious inſects begin their works, it is obſerved they divide themſelves into four parties, one of which is deſtined to the fields to provide materials for the ſtructure: the ſecond works upon thoſe materials, and forms them into a rough ſketch of the dimenſions and partitions of the cells; the third examines and adjuſts the angles, removes the ſuperfluous wax, poliſhes the work, and gives it its neceſſary perfection; and the fourth is employed in bringing proviſions to the labourers that build them, becauſe poliſhing is not ſo laborious. They begin their work at the top of the hive, continuing downwards to the bottom, and from one ſide to the other; and to make it the more ſolid they uſe a ſort of tempered wax, reſembling glue. The form of the cells of the honey-comb is hexagonal, which figure, and beſides what is common with a ſquare and equilateral triangle, has the advantage of including a greater ſpace within the ſame ſurface.

The expedition of the bees in their labours is almoſt incredible; for notwithſtanding the elegance and juſt proportions of the work, they are ſo indefatigable, that they will, in one day, finiſh a honey-comb a foot long, and ſix inches broad, capable of receiving three thouſand bees.

It is not eaſy to know, particularly, the manner in which they employ themſelves at this work, on account of the number of bees then in motion, by which means the eye can hardly diſtinguiſh any thing but confuſion. We have however been able to obſerve the following particulars: ſome bees, bearing in each of their talons a little piece of wax, are ſeen running to the places where their companions are at work upon the combs; at their arrival they faſten the wax to the work by means of the ſame talons, which they apply ſometimes to the right, and ſometimes to the left. Each bee is employed but a ſhort time on this work, when another takes its place.

While a part of the bees are at work in conſtructing the cells, others are employed in perfecting thoſe that are newly modelled, finiſhing the angles, ſides, and baſes, in ſo exquiſite a manner, and with ſuch remakable delicacy, that three or four of theſe ſides laid upon one another, are not thicker than a leaf of common paper; and becauſe the entrance of the cell, which is adapted to the ſize of the bee, would on account of this delicacy, be ſubject to break, they ſtrengthen the entrance of each cell with a border of wax.

We have already obſerved, that the bees which build the cells work but a little while at a time; but it is different with regard to thoſe that poliſh them, for they work for a long while, and with great expedition, never intermitting their labour, unleſs it be to carry out of the cell the particles of wax taken off in poliſhing: and, to prevent this wax from being loſt, other bees ſtand ready to receive it from the poliſhers, and carry it to ſome other part, in order to its being employed.

Each comb has two rows of cells oppoſite to each other, which have their common baſes. The thickneſs of each comb is ſomething leſs than an inch; and, conſequently, the depth of each cell about five lines: but at the ſame time the breadth of each is little more than two.

All the combs are conſtructed with cells of this ſize, except a ſmall number of others in ſome particular parts of the hive, which are larger and appropriated to the lodging eggs, that afterwards become drones, or malebees.

There are alſo, in ſome parts of the hive, three or four cells bigger than the others, and conſtructed in a different manner. They are of a ſpheroidical figure, open in the inferior part, and attached to the extremities of the combs.

When the cells are completed, the queen takes poſſeſſion of thoſe ſhe likes beſt to depoſit her eggs in, and the reſt are left to be filled with honey. She lays one egg in each cell, and ſometimes more than an hundred of thoſe eggs in a day; but what is ſtill more remarkable, ſhe lays thoſe eggs which are to produce common bees in cells of the common ſhape and ſize; thoſe that are to become drones or males, in the cells of a larger ſize, and depoſits thoſe which are to become females, like herſelf, in the ſpheroidical cells already deſcribed.

Theſe eggs, after lying ſome time in the cells, are hatched into maggots, and fed with honey ten or twelve days, after which the other bees cloſe up the cells with a thin piece of wax; and under this covering they become gradually transformed into bees, in the manner as ſilk-worms are into butterflies. Having undergone this change, the young bees pierce through their waxen doors, wipe off the humidity from their little wings, take their flight into the fields, rob the flowers of their ſweets, and are perfectly acquainted with every neceſſary circumſtance of their future conduct. As to the males or drones, which are deſtined only to propagate their ſpecies, they live very comfortably for about three months after they are hatched; but when that time is over, and the females are impregnated, the common bees either kill them, or drive them from the hive, as burthenſome to the community, and not a drone is to be found till the next ſeaſon.

The method in which the bees collect their wax and honey deſerves to be a little explained. At the bottom of all flowers there are certain glands which contains more or leſs honey, that is, the moſt exalted particles of the ſugary juices of the plant. Theſe juices the bee ſucks up with her proboſcis or trunk above-mentioned, and draws it into her mouth; and when it has thus taken a ſufficient quantity into her ſtomach, returns to the hive, and diſcharges the honey into the common magazine.

When the cells prepared to receive it are full, the bees cloſe up ſome with wax till they have occaſion for the honey; the reſt they leave open, to which all the members of the ſociety reſort, and take their repaſt with a very inſtructive moderation.

It is an excellent obſervation of a modern author, that the hive is a ſchool to which numbers of people ought to be ſent; prudence, induſtry, benevolence, public ſpiritedneſs, œconomy, neatneſs, and temperance, are all viſible among the bees. Theſe little animals are actuated by a ſocial ſpirit, which forms them into a body politic, intimately united, and perfectly happy. They all labour for the general advantage; they are all ſubmiſſive to the laws and regulations of the community: having no particular intereſt, no diſtinction but thoſe which nature or the neceſſities of their young have introduced amongſt them. We never ſee them diſſatiſfied with their condition, or inclinable to abandon the hive in diſguſt, or find themſelves ſlaves or neceſſitous: on the contrary, they think themſelves in perfect freedom, and perfect affluence; and ſuch indeed is their real condition. They are free, becauſe they only depend on the laws; they are happy, becauſe the concurrence of their ſeveral labours inevitably produces abundance, which contributes to the riches of each individual. Let us compare human ſocieties with this, and they will appear altogether monſtrous. Neceſſity, reaſon, and philoſophy, have eſtabliſhed them for the commendable purpoſes of mutual aid and benefits: but a ſpirit of ſelfiſhneſs deſtroys all; and one half of mankind, to load themſelves with ſuperfluities, leave the other diſtitute of common neceſſaries.

Wax is compoſed of the farina, or duſt, formed on the apices of flowers. This the bees collect, and with their fore-feet and jaws, roll up into little balls, which they convey, one at a time, to the feet of their middle legs, and from thence to the middle joints of their hind-legs, where there is a ſmall cavity like a ſpoon to receive it. Theſe balls are not, however, true wax, but the ſubſtance or baſis of it: to reduce this crude ſubſtance into wax, it muſt firſt be digeſted in the body of the bee.

After the bees have brought home this crude ſubſtance, they eat it by degrees; or, at other times, three or four bees come and eaſe the loaded bee by eating each of them a ſhare, the loaded bee giving them a hint ſo to do. Hunger is not the motive of their thus eating the balls of waxy matter, eſpecially when a ſwarm is firſt hived; but it is their deſire to provide a ſpeedy ſupply of real wax for making their combs. At other times, when there is no immediate want of wax, the bees lay this matter up in repoſitories, to keep it in ſtore.

When this waxy matter is ſwallowed, it is by the digeſtive powers of the bee, converted into real wax, which the bees again diſgorge as they work it up into combs; for it is only while thus ſoft and pliant from the ſtomach that they can fabricate it properly. That the wax thus employed is taken from their ſtomachs, appears from their making a conſiderable quantity of comb ſoon after they are hived, and even on any tree or ſhrub where they have reſted but a ſhort while before their being hived, though no balls were viſible on their legs, excepting thoſe of a few which may be juſt returned from the field.

Bees collect crude wax alſo for food; for if this was not the caſe, there would be no want of wax after the combs are made: but they are obſerved, even in old hives, to return in great numbers loaded with ſuch matter, which is depoſited in particular cells, and is known by the name of *bee-bread*. We may gueſs that they conſume a great deal of this ſubſtance in food, by the quantity collected, which, by computation, may in ſome hives amount to an hundred weight in a ſeaſon, whilſt the real wax in ſuch an hive does not perhaps exceed two pounds.

But beſides the three ſubſtances, honey, wax, and bee-bread, already mentioned, there is another with which the bees cloſe every crevice in their hives, and which is called propolis. It is a kind of reſin eaſy to be rolled out, much more tenacious than wax, and more eaſily fixed. It does not ſeem to require any preparation, being a real reſin, which they collect from trees, and employ as they find it. It grows very hard in the hive, but may be ſoftened by heat. It is diſſoluble in ſpirit of wine. It commonly diffuſes a very agreeable ſmell when heated. Its outward colour is of a reddiſh brown; its inſide reſembles wax, and is a little yellowiſh. When the bees make uſe of it, it is ſoft and pliable; but it hardens daily, and becomes in time harder than wax. This propolis ſerves alſo for another purpoſe, which is, that when a ſnail, ſlug, or any other creature too large to be carried out by the bees, has been ſlain in the hive, they caſe it over with this ſubſtance, and thereby prevent the bad effects of the putrid ſmell ariſing from dead bodies.

When the hive is become too much crowded, by the addition of the young brood, a part of the bees think of finding themſelves a more commodious habitation, and with that view ſingle out the moſt forward of the young queens. A new ſwarm is therefore conſtantly compoſed of one queen at leaſt, and of ſeveral thouſand working bees, as well as of ſome hundreds of drones. The working bees are ſome old, ſome young.

Scarce has the colony arrived at its new habitation, when the working bees labour with the utmoſt diligence, to procure materials for food and building. Their principal aim is not only to have cells in which they may depoſit their honey; a ſtronger motive ſeems to animate them. They ſeem to know that their queen is in haſte to lay her eggs. Their induſtry is ſuch, that in twenty-four hours they will have made combs twenty inches long, and wide in proportion. They make more wax during their firſt fortnight, if the ſeaſon is favourable, than they do during all the reſt of the year. Other bees are at the ſame time buſy in ſtopping all the holes and crevices they find in their new hive, in order to guard againſt the entrance of inſects which covet their honey their wax, or themſelves; and alſo to exclude the cold air, for it is indiſpenſably neceſſary that they be lodged warm.

When the bees firſt ſettle in ſwarming, indeed when they at any time reſt themſelves, there is ſomething very particular in their method of taking their repoſe. It is done, by collecting themſeves in a heap, and hanging to each other by their feet. They ſometimes extend theſe heaps to a conſiderable length. It would ſeem probable to us, that the bees from which the others hang, muſt have a conſiderable weight ſuſpended to them. All that can be ſaid is, that the bees muſt find this to be the ſituation agreeable to themſelves. They may perhaps have a method of diſtending themſelves with air, thereby to leſſen their ſpecific gravity, in the ſame manner as fiſhes do, in order to alter their gravity, compared with water.

When a ſwarm divides into two or more bands which ſettle ſeparately, this diviſion is a ſure ſign that there are two or more queens among them. One of theſe cluſters is generally larger than the other. The bees of the ſmaller cluſter, or cluſters, detach themſelves by little and little, till at laſt the whole, together with the queen, or queens, unite with the larger cluſter. As ſoon as the bees are hived and ſettled, the ſupernumerary queen, or queens, muſt be ſacrificed to the peace and tranquillity of the hive. This execution generally raiſes a conſiderable commotion in the hive, and ſeveral other bees, as well as the queen, or queens, loſe their lives. Their bodies may be obſerved on the ground, near the hive. The queen that is choſen is of a more reddiſh colour than thoſe which are diſtroyed; ſo that fruitfulneſs ſeems to be a great motive of preference in bees; for the nearer they are to the time of laying their eggs, the bigger, larger, and more ſhining are their bodies.

For three or four nights before a ſwarm ſallies forth, there is in the hive a peculiar humming noiſe, of which authors give very different deſcriptions, probably owing to the ſtrength of imagination in each. Every ſound among bees ariſes from their ſtriking their wings againſt the air: their wings being their ſole organ of ſound, if we may be allowed the expreſſion. By moving their wings more or leſs forcibly and ſwiftly, they beat the air, and form the varied confuſed ſounds which we call humming. The noiſe which foretels their ſwarming is eaſily diſtinguiſhed by thoſe who are accuſtomed to it, and is more eſpecially obſerved before the caſts, or ſecond and following ſwarms. The hive appears ſo full of bees, that part of them hang in cluſters on the outſide; and the drones are preceived flying about in greater numbers than uſual. But the moſt certain ſign, and which indicates this event to be on that day, is, that the bees refrain from flying into the fields, though the ſeaſon ſeems inviting. Juſt before they take their flight, there is an uncommon ſilence in the hive, and this continues for ſome time: but as ſoon as one breaks forth, they all follow, and are inſtantly on the wing. They ſeldom ſwarm before the ſun has warmed the air; that is, not before ten in the morning, and ſeldom later than three in the afternoon; and the time of the year in which they moſt generally ſwarm, is from the middle of May to the end of June: but ſometimes ſooner or later, according as the ſeaſon is more or leſs favourable. The earlieſt ſwarms do not always prove the beſt, eſpecially if they are ſo early as the end of April or beginning of May: for the weather often is afterwards ſo wet and cold, that they are frequently in danger of being deſtroyed, or greatly reduced by famine. Though ſwarms which iſſue forth ſo late as July are not in danger of a preſent famine; yet, they ſcarcely have time and opportunity to lay in a ſufficient ſtore for the winter. Towards the ſeaſon of ſwarming, the door of the hive ſhould be enlarged, to give the bees the greater freedom to iſſue out; and it ſhould likewiſe remain ſo for young ſwarms, during the firſt fortnight or three weeks, to allow the freer entrance to the bees, at that time extremely buſy in collecting their neceſſary ſtores. The entrance ſhould afterwards be gradually leſſened, to prevent the otherwiſe eaſy acceſs of enemies, of which there is great danger, eſpecially as the autumn advances.

Hives continue ſometimes to ſend forth ſwarms till the old hive becomes too much weakened, part that of it is empty. It is probable, that the prolific young queens prompt the bees to ſwarm thus frequently: for it is certain that if there is not a young mother qualified to bring forth a numerous progeny, though there be ever ſo great a number of bees, they will all remain, and die rather than quit the hive.

Whenever the bees of a ſwarm fly too high, they are made to deſcend lower, and diſpoſed to ſettle, by throwing among them handfuls of ſand or duſt: probably the bees miſtake this for rain. It is uſual at the ſame time to beat on a kettle or frying-pan; perhaps from its being obſerved that the noiſe of thunder prompts ſuch bees as are in the field to return home. Precautions of this kind are the more neceſſary, if, as Dr. Warder, in his True Amazont, obſerves, "the bees always provide a place for their habitation before they ſwarm; either in ſome hollow tree, or in the hollow part of ſome old building, or in ſome deſerted hive, which the ſwarms have already prepared, by cleaning out whatever may be offenſive to their cleanly nature." Of this he gives an inſtance; and concludes, that "though they provide themſelves with a houſe before they ſwarm, and take much pains about it; yet if you are early enough in your taking the ſwarm, and they find themſelves at unawares in a convenient houſe, they have no mind generally to leave it: but if they riſe again the ſame or next day, be ſure not to hive them in the ſame hive again, for it is plain they have ſome diſlike to it."

That the bees provide themſelves a habitation before they ſwarm, is a very juſt obſervation, a remarkable inſtance of which I was witneſs of at a gentleman's ſeat in Gloceſterſhire ſome years ago, where, walking in the garden in which were ſeveral bee-hives in the month of June, the bees were in full work, and paſſing in and out of the hives in great numbers, as is uſual in fine weather at that ſeaſon. In one hive only a very few bees were paſſing, and I was told it was an empty hive. I turned it up, and found it ſo, except a few bees near the crown of it, and the reaſon of their being there did not then occur to me: but next day a woman who lived in the neighbourhood, came running to the gardener, acquainting him, that ſhe had juſt loſt a ſwarm of bees ſhe had hived the evening before, which ſhe ſaw go off, and had followed them to the garden wall, and requeſted ſhe might be permitted to take them away, being perſuaded that they were lodged ſomewhere in the garden. Upon ſearch, a ſwarm was found in the hive that I had obſerved was empty the day before: ſome of the bees were in the hive, and the reſt at the mouth of it, on the outſide. In the evening the woman brought her hive, hived the bees in it a ſecond time and carried them home at night: but next morning they came off again, and ſettled as at firſt upon the empty hive in the gentleman's garden. As it appeared by this that the woman's hive was diſagreeable to them, ſhe was allowed to carry the bees home in the hive they had choſen for themſelves, which ſhe placed where ſhe had put them at firſt, and in this hive they remained quiet, and ſoon went to work.

I have related this, not only in confirmation of what is obſerved above, of bees providing a habitation for themſelves before they ſwarm, but alſo for another reaſon: for having once a pretty large apiary, conſiſting of common ſtraw hives, and boxes of various conſtructions, ſome of which happening to be empty, I found a ſwarm had taken poſſeſſion of one of them. After this I placed ſome empty hives every ſummer in my apiary, whereof one or more were commonly filled by ſwarms from my other hives, which ſaved the trouble of watching and hiving them. And ſometimes ſwarms would ſettle in them, that I knew not whence they came. In this way a perſon deſirous of having bees might obtain ſome, without any trouble, if the ſituation is good: by placing a few empty hives in readineſs for them, and many good ſwarms might be thus ſaved, that fix themſelves in hollow-trees, old walls, and other inacceſſible places, where they are of no uſe to any body. All the preparation neceſſary for theſe empty hives is, that they be very ſweet and perfectly clean, and the inſides well rubbed with a clean coarſe linen cloth, to break off the ſhort ſtraws, or other roughneſs in the hive. Some in dreſſing their hives, rub the inſides of them with ſweet herbs, and ſome with honey: but I made no other preparations, than rubbing off the ſhort ſtraws, and keeping them very clean. Bees are commonly put into ſtraw hives; and ſwarms ſeem to take to theſe more readily than to boxes, when left to their own choice.

As ſoon as the ſwarm is ſettled, the bees which compoſe it ſhould be got into a hive with all convenient ſpeed, to prevent their taking wing again. If they ſettle on a ſmall branch of a tree, eaſy to be come at, it may be cut off, and laid upon a cloth; the hive being ready immediately to put over them. If the branch cannot be conveniently cut, the bees may be ſwept from off it into a hive. Lodge but the queen in the hive, and the reſt will ſoon follow. If the bees muſt be conſiderably diſturbed in order to get them into the hive, the moſt adviſable way is to let them remain in the place where they have pitched, till the evening, when there is leſs danger of their taking wing. If it be obſerved that they ſtill hover about the place they firſt alighted upon, the branches there may be rubbed with rue, or elder leaves, or any other thing diſtaſteful to them, to prevent their returning to it.

The hive employed on this occaſion ſhould be cleaned with the utmoſt care, and its inſide be rubbed very hard with a coarſe cloth, to get off the looſe ſtraws, or other impurities, which might coſt them a great deal of time and labour to gnaw away. It may then be rubbed with fragrant herbs or flowers, the ſmell of which is agreeable to the bees, or with honey.

The hive ſhould not be immediately ſet on the ſtool where it is to remain, but ſhould be kept near the place at which the bees ſettle, till the evening, leſt ſome ſtragglers ſhould be left. It ſhould be ſhaded, either with boughs, or with a cloth, that the too great heat of the ſun may not annoy the bees.

We ſometimes ſee a ſwarm of bees, after having left their hive, and even alighted upon a tree, return to their firſt abode. This never happens but when the young queen did not come forth with them for want of ſtrength, or perhaps courage to truſt to her wings for the firſt time; or poſſibly from a conſcionſueſs of her not being impregnated.

Bees are not apt to ſting when they ſwarm: therefore it is not neceſſary then to take much extraordinary precaution againſt them. It is however adviſable for thoſe who are not accuſtomed to them, to cover their face and hands.

A ſecond ſwarm ſcarcely is, and much leſs are the ſubſequent ones, worth keeping ſingle; becauſe, being few in number, they cannot allow ſo large a proportion of working bees to go abroad in ſearch of ſtore, as more numerous ſwarms can, after having appointed a proper number for the various works to be done within. For this reaſon it is adviſable to unite two or more of theſe laſt or latter ſwarms into one hive, ſo as to procure a ſufficient number of bees in one hive. Bees ſometimes ſwarm ſo often, that the mother-hive is too much weakened. In this caſe, the ſwarms ſhould be reſtored back; and this ſhould alſo be done when a ſwarm produces the firſt ſummer, as it ſometimes does. The beſt way, indeed, is to prevent ſuch ſwarming, by giving the bees more room: though this, again, will not anſwer when there is a young pregnant queen; ſhe well knowing that her life is the forfeit of her remaining at home.

The uſual method of uniting ſwarms is very eaſy. Spread a cloth at night upon the ground cloſe to the hive, in which the two caſts of ſwarms are to be united; lay a ſtick acroſs this cloth; then fetch the hive with the new ſwarm, ſet it over the ſtick, give a ſmart ſtroke on the top of the hive, and all the bees will drop down upon the cloth in a cluſter. This done, throw aſide the empty hive, take the other from off the ſtool, and ſet this laſt over the bees, who will ſoon aſcend into it, mix with thoſe already there, and become one and the ſame family. Others, inſtead of ſtriking the bees down upon the cloth, place with its bottom upmoſt the hive in which the united ſwarms are to live, and ſtrike the bees of the other hive down into it. The former of theſe hives is then reſtored to its natural ſituation, and the bees of both hives ſoon unite. If ſome bees ſtill adhere to the other hive, they may be bruſhed off on the cloth, and they will ſoon join their brethren. Or one may take the following method, which gives leſs diſturbance to the bees. Set with its mouth upmoſt the hive into which the young ſwarm has been put, and ſet upon it the other hive. The bees in the lower hive, finding themſelves in an inverted ſituation, will ſoon aſcend into the upper.

Though all writers acknowledge, that one of the queens is conſtantly ſlain on theſe occaſions, and generally a conſiderable number of the working bees; yet none of them, Columella excepted, has propoſed the eaſy remedy of killing the queen of the latter caſt or ſwarm before the union is made; a means by which the lives of the working bees may be preſerved. This may be done, either by intoxicating them, and then picking her out, or by ſearching her out when the bees are beating down upon the cloth; for this being done in the night, to prevent the battle which might otherwiſe enſue, there will be no great difficulty in finding her.

A large ſwarm may weigh eight pounds, and ſo gradually leſs, to one pound: conſequently a very good one may weigh five or ſix pounds. All ſuch as weigh leſs than four pounds ſhould be ſtrengthened, by uniting to each of them a leſs numerous ſwarm. The ſize of the hive ſhould be proportioned to the number of the bees; and, as a general rule, it ſhould be rather under than over ſized, becauſe bees require to be kept warmer than a large hive will admit of.

Columella directs, that the apiary, or bee-garden, ſhould face the ſouth, in a place neither too hot, nor too much expoſed to the cold; that it be in a valley, in order that the loaded bees may with the greater eaſe deſcend to their homes; that it be near the manſion-houſe, on account of the conveniency of watching them, but ſo ſituated as not to be expoſed to noiſome ſmells, or to the din of men or cattle; that it may be ſurrounded with a wall, which however ſhould not riſe above three feet high; that, if poſſible, a running ſtream be near them, or, if that cannot be, that water be brought near them, in troughs, with pebbles or ſmall ſtones in the water, for the bees to reſt on whilſt they drink; or that the water be confined within gently declining banks, in order that the bees may have ſafe acceſs to it; they not being able to produce either combs, honey, or food for their maggots, without water. That the neighbourhood of rivers or baſons of water with high banks be avoided becauſe winds may whirl the bees into them, and they cannot eaſily get on ſhore from thence to dry themſelves; and that the garden, in which the apiary ſtands, be well furniſhed with ſuch plants as affords the bees plenty of good paſture. The trees of this garden ſhould be of the dwarf kind, and their heads buſhy, in order that the ſwarms which ſettle on them may be the more eaſily hived.

The proprietor ſhould be particularly attentive that the bees have alſo in their neighbourhood ſuch plants as yield them plenty of food. Columella enumerates many of theſe fitted to a warm climate: among them he mentions thime, the oak, the pine, the ſweet ſmelling cedar, and all fruit trees. Experience has taught us, that furz, broom, muſtard, clover, heath, buck-wheat, &c. are excellent for this purpoſe. Pliny recommends broom, in particular, as a plant exceedingly grateful, and very profitable to bees; and Mr. Bradley ſpeaks highly of the advantages which ariſe from the planting of it for the food of theſe uſeful inſects. *See the article* BROOM.

Plantations of muſtard, of the flowers of which bees are extremely fond, may be kept in bloom for ſeveral weeks running.

Great improvements may alſo certainly be made in the eſſential article of providing plenty of paſture for bees, whenever this ſubject ſhall be more carefully attended to than it, unfortunately, has hitherto been. A rich corn country is well known to be a barren deſert to them during the moſt conſiderable part of the year; and therefore the pactice of other nations, in ſhifting the places of abode of their bees, well deſerves our imitation.

Columella informs us, that, as few places are ſo happily ſituated as to afford the bees proper paſture both in the beginning of the ſeaſon and alſo in the autumn, it was the adviſe of Celſus, that after the vernal paſtures are conſumed, the bees ſhould be tranſported to places abounding with autumnal flowers; as was practiſed by conveying the bees from Achaia to Artica, from Eubœa and the Cyclad iſlands to Scyrus, and alſo in Sicily, where they were brought to Hybla from other parts of the iſland. He likewiſe directs, that the hives be carefully examined before they are removed from one place to another, and to take out ſuch combs as appear old, looſe, or have moths in them, reſerving only thoſe that are ſound, in order that the hive may be ſtored with combs collected from the beſt flowers.

Mr. Maillet, in his curious deſcription of Egypt, relates, that "ſpite of the ignorance and ruſticity which have got poſſeſſion of that country, there yet remain in it ſeveral footſteps of the induſtry and ſkill of the ancient Egyptians. One of their moſt admirable contrivances is, their ſending their bees annually into diſtant countries, in order to procure them ſuſtenance there, at a time when they could not find any at home; and their afterwards bringing them back, like ſhepherds who ſhould travel with their flocks, and make them feed as they go. It was obſerved by the antient inhabitants of Lower Egypt, that all plants bloſſomed, and the fruits of the earth ripened, above ſix weeks earlier in Upper Egypt than with them. They applied this remark to their bees; and the means then made uſe of by them, to enable theſe uſeful induſtrious inſects to reap advantage from the more forward ſtate of nature there, were exactly the ſame as are now practiſed, for the like purpoſe, in that country. About the end of October, all ſuch inhabitants of the Lower Egypt as have hives of bees, embark them on the Nile, and convey them upon that river quite into Upper Egypt; obſerving to time it ſo that they arrive there juſt when the inundation is withdrawn, the lands have been ſown, and the flowers begin to bud. The hives thus ſent are marked and numbered by their reſpective owners, and placed pyramidically in boats prepared for the purpoſe. After they have remained ſome days at their fartheſt ſtation, and are ſuppoſed to have gathered all the wax and honey they could find in the fields within two or three leagues around, their conductors convey them, in the ſame boats, two or three leagues lower down, and there leave the laborious inſects ſo long time as is neceſſary for them to collect all the riches of this ſpot. Thus, the nearer they come to the place of their more permament abode, they find the productions of the earth, and the plants which afford them food, forward in proportion. In fine, about the beginning of February, after having travelled through the whole length of Egypt, gathering all the rich produce of the delightful banks of the Nile, they arrive at the mouth of that river, towards the ocean; from whence they ſet out, and from whence they are now returned to their ſeveral homes: for care is taken to keep an exact regiſter of every diſtrict from whence the hives were ſent in the beginning of the ſeaſon, of their numbers, of the names of the perſons who ſent them, and likewiſe of the mark or number of the boat in which they were placed."

The author of the Natural Hiſtory of Bees, gives the following account of what is practiſed in this way in France; an example well worthy of our imitation in many parts of this kingdom. "M. Proutaut, ſays he, keeps a great number of hives. His ſituation is one of thoſe in which flowers become rare or ſcarce very ſoon, and where few or none are ſeen after the corn is ripened. He then ſends his bees into Beauce, or the Gatinois, in caſe it has rained in thoſe parts. This is a journey of about twenty miles, which he makes them take: but if he concludes that the bees could not meet in either of thoſe countries, wherewith to employ themſelves advantageouſly, he then has them carried into Sologne about the beginning of Auguſt, as knowing that they will there meet with a great many fields of buck-wheat in flower, which will continue ſo till about the end of September. His method of tranſporting them is thus. His firſt care is, to examine thoſe hives, ſome of whoſe honey-combs might be broken or ſeparated by the jolting of the vehicle: they are made faſt one to the other, and againſt the ſides of the hive, by means of ſmall ſticks, which may be diſpoſed differently as occaſion will point out. This being done, every hive is ſet upon a packing-cloth, or ſomething like it, the threads of which are very wide: the ſides of this cloth are then turned up, and laid on the outſide of each hive, in which ſtate they are tied together with a piece of ſmall pack-thread wound ſeveral times round the hive. As many hives as a cart built for that purpoſe will hold, are afterwards placed in this vehicle. The hives are ſet two and two, the whole length of the cart. Over theſe are placed others; which make, as it were, a ſecond ſtory or bed of hives. Thoſe which are ſtored with combs ſhould always be turned topſy-turvy. It is for the ſake of their combs, and to fix them the better, that they are diſpoſed in this manner; for ſuch as have but a ſmall quantity of combs in them, are placed in their natural ſituation. Care is taken in this ſtowage, not to let one hive ſtop up another, it being eſſentially neceſſary for the bees to have air; and it is for this reaſon they are wrapped up in a coarſe cloth, the threads of which were wove very wide, in order that the air may have a free paſſage, and leſſen the heat which theſe inſects raiſe in their hives; eſpecially when they move about very tumultuouſly, as often happens in theſe carts. Thoſe uſed for this purpoſe in Yêvre, hold from thirty to forty-eight hives. As ſoon as all are thus ſtowed, the caravans ſet out. If the ſeaſon is ſultry they travel only in the night; but a proper advantage is made of cool days. You will imagine that they do not ride poſt. The horſes muſt not be permitted even to trot; they are led ſlowly, and through the ſmootheſt roads. When there are not combs in the hives ſufficient to ſupport the bees during their journey, the owner takes the earlieſt opportunity of reſting them wherever they can collect wax. The hives are taken out of the cart, then ſet upon the ground, and after removing the cloth from over them, the bees go forth in ſearch of food. The firſt field they come to ſerves them as an inn. In the evening, as ſoon as they are all returned, the hives are ſhut up; and being placed again in the cart, they proceed in their journey. When the caravan is arrived at the journey's end, the hives are diſtributed in the gardens, or in fields adjacent to the houſes of different peaſants, who, for a very ſmall reward, undertake to look after them. Thus it is that, in ſuch ſpots as do not abound with flowers at all ſeaſons, means are found to ſupply the bees with food during the whole year."

Theſe inſtances of the great advantages which attend ſhifting of bees in ſearch of paſture, afford an excellent leſſon to many places in this kingdom: they direct particularly the inhabitants of the rich vales, where the harveſt for bees ends early, to remove their ſtocks to places which abound in heath, this plant continuing in bloom during a conſiderable part of the autumn, and yielding great plenty of food to bees. Thoſe in the neighbourhood of hills and mountains will ſave the bees a great deal of labour, by taking alſo the advantage of ſhifting their places of abode.

We come now to explain the moſt inhuman method commonly practiſed of taking bees, which conſiſts in wantonly deſtroying the whole ſwarm, in order to enjoy the fruits of their labours.

Were we to kill the hen for her egg, the cow for her milk, or the ſheep for the fleece it bears, every one would inſtantly ſee how much we ſhould act contrary to our own intereſt; and yet this is practiſed every year in regard to bees. Would it not argue more wiſdom in us to be contented with taking away only a portion of their wax and honey, as is the practice of many countries? The common method here is, that when thoſe which are doomed for ſlaughter have been marked out (which is generally done in September) a hole is dug near the hive, and a ſtick, at the end of which is a rag that has been dippid in melted brimſtone, being ſtuck in that hole, the rag is ſet on fire, the hive is immediately ſet over it, and the earth is inſtantly thrown up all around, ſo that none of the ſmoke can eſcape. In a quarter of an hour, all the bees are ſeemingly dead; and they will ſoon after be irrecoverably ſo, by being buried in the earth that is returned back into the hole: I ſay, they will ſoon be abſolutely killed by this laſt means; becauſe it has been found, by experiment, that all the bees which have been affected only by the fume of the brimſtone, recover again, excepting ſuch as have been ſinged or hurt by the flame. Hence it is evident, that the fume of brimſtone might be uſed for intoxicating the bees, with ſome few precautions. The heavieſt and the lighteſt hives are alike treated in this manner; the former, becauſe they yield the moſt profit, with an immediate return; and the latter, becauſe they would not be able to ſurvive the winter. Thoſe hives which weigh from fifteen to twenty pounds, are thought to be the fitteſt for keeping.

The practice of the ancients was, however, very different from this: they were content to ſhare with theſe induſtrious inſects the produce of their labours; and ſome very laudable attempts have been made in our own country, to attain the deſirable end of getting the honey and wax without deſtroying the bees. John Geddy, eſq; publiſhed, in the year 1665, his invention of boxes for preſerving the lives of bees. Theſe were improved by Joſeph Warder, phyſician, at Croydon, who at the ſame time embelliſhed his account of the ſtructure and uſe of theſe boxes, with ſeveral other curious circumſtances concerning bees, in his work intitled, The True Amazons, or the Monarchy of Bees. Two very worthy clergymen, the reverend Mr. John Thorley of Oxford, and the reverend Mr. Stephen White, M. A. rector of Holton in Suffolk, have brought the method of preſerving the lives of bees to ſtill greater perfection. We ſhall relate the opinions and practice of each, beginning with Mr. Thorley, who lived many years before Mr. White, and add to their accounts the beſt improvements that have been lately made in foreign countries.

Mr. Thorley, in his Enquiry into the Nature, Order, and Government of Bees, thinks colonies preferable to hives, for the following reaſons. Firſt, the more certain preſervation of very many thouſands of theſe noble and uſeful creatures: Secondly, their greater ſtrength (which conſiſts in numbers), and conſequently their greater ſafety from robbers: Thirdly, their greater wealth, ariſing from the united labours of the greater number. He tells us, that he has in ſome ſummers taken two boxes filled with honey from one colony, and yet ſufficient ſtore has been left for their maintenance during the winter, each box weighing forty pounds. Add to theſe advantages, the pleaſure of viewing them with the greateſt ſafety, at all ſeaſons, even in the buſieſt time of gathering, and their requiring a much leſs attendance in ſwarming time. The bees thus managed are alſo more effectually ſecured from wet and cold, from mice, and other vermin.

His boxes are made of deal, which, being ſpungy, ſucks up the breath of the bees ſooner than a more ſolid wood would do. Yellow dram-deal, thoroughly ſeaſoned, is the beſt.

An octagon, being nearer to a ſphere, is better than a ſquare form: for as the bees, in winter, lie in a round body near the center of the hive, a due heat is then conveyed to all the out parts, and the honey is kept from candying.

The dimenſions which Mr. Thorley, after many years experience, recommends for the boxes, are ten inches deep, and twelve or fourteen inches broad, in the inſide. He has tried boxes containing a buſhel or more, but found them not to anſwer the deſign like thoſe of a leſſer ſize.

The top of the box ſhould be made of an entire board, a full inch thick after it has been planed, and it ſhould project on all ſides at leaſt an inch beyond the dimenſions of the box. In the middle of this top there muſt be a hole five inches ſquare, for a communication between the boxes; and this hole ſhould be covered with a ſliding ſhutter, of deal or elm, running eaſily in a groove over the back window. The eight pannels, nine inches deep, and three quarters of an inch thick when planed, are to be let into the top ſo far as to keep them in their proper places; to be ſecured at the corners with plates of braſs, and to be cramped with wires at the bottom, to keep them firm; for the heat in ſummer will try their ſtrength. There ſhould be a glaſs window behind, fixed in a frame, with a thin deal cover, two ſmall braſs hinges, and a button to faſten it. This window will be ſufficient for inſpecting the progreſs of the bees. Two braſs handles, one on each ſide, are neceſſary, to lift up the box: theſe ſhould be fixed in with two thin plates of iron, near three inches long, ſo as to turn up and down, and put three inches below the top-board, which is nailed cloſe down with ſprigs to the other parts of the box.

Thoſe who chuſe a frame within, to which the bees may faſten their combs, need only uſe a couple of deal ſticks of an inch ſquare, placed acroſs the box, and ſupported by two pins of braſs; one an inch and a half below the top, and the other two inches below it; by which means the combs will quickly find a reſt. One thing more, which perfects the work, is a paſſage four or five inches long, and leſs than half an inch deep, for the bees to go in and out at the bottom of the box.

Mr. Thorley, ſon to the above-mentioned clergyman, has improved his father's method of managing bees; and having been convinced, from near ſixty years experience, that his bee-hives would be productive of much greater profit to the owners of bees, and alſo render that cruel and ungenerous practice of deſtroying theſe animals not only unneceſſary, but pernicious, preſented a bee-hive of this conſtruction to the Society of Arts, &c. in the Strand, who readily purchaſed another of his hives filled with honey, &c. that they might be inſpected by the curious, and brought into univerſal uſe; and from this bee-hive the view on Plate III. fig. 8. was drawn. The ſociety, perſuaded that the invention would prove of the greateſt advantage to this country, publiſhed a premium of two hundred pounds, in order to introduce Mr. Thorley's, or ſome other method of a ſimilar kind, whereby much larger quantities of honey and wax might be procured, and, at the ſame time, the lives of theſe laborious and uſeful inſects preſerved.

The bottom part, marked *a*, is an octangular bee-box, made of deal boards, about an inch in thickneſs, the cover of which is about 17 inches in diameter, but the internal part only 15½, and its height 10 inches. In the middle of the cover of this octangular box is a hole, which may be opened or ſhut at pleaſure, by means of a ſlider *d*. In one of the pannels is a pane of glaſs, covered with a wooden door, *e*. The entrance, *f*, at the bottom of the box, is about three inches and a half broad, and half an inch high. Two ſlips of deal, about half an inch ſquare, croſs each other in

the center of the box, and are faſtened to the pannels by means of ſmall ſcrews. To theſe ſlips the bees faſten their combs.

In this octangular box the bees are hived, after ſwarming in the uſual manner, and there ſuffered to continue till they have built their combs, and filled them with honey, which may be known from opening the door, and viewing their works through the glaſs-pane, or by the weight of the hive. When the bee-maſter finds his laborious inſects have filled their habitation, he is to place a common bee-hive of ſtraw, repreſented at *b*, made either flat at the top, or in the common form, on the octangular box, and draw out the ſlider, by which a communication will be opened between the box and the bee-hive; the conſequence of which will be, that thoſe laborious inſects will fill this hive alſo with the product of their labours. When the bee-maſter finds the ſtraw-hive is well filled, he may puſh in the ſlider, and take it away, placing another immediately in its room, and then drawing out the ſlider. Theſe indefatigible creatures will then fill the new hive in the ſame manner. By proceeding in this method, Mr. Thorley aſſured the Society that he had taken three ſucceſſive hives, filled with honey and wax, from one ſingle hive, during the ſame ſummer; and that after he had laid his inſects under ſo large a contribution, the food ſtill remaining in the octangular box was abundantly ſufficient for their ſupport during the winter. He added, that if this method was purſued in every part of the kingdom, inſtead of that cruel method of putting the creatures to death, he was purſuaded, from long experience, that wax would be collected in ſuch plenty that candles might be made with it, and ſold as cheap as thoſe of tallow are at preſent.

Mr. Thorley has alſo added another part to his bee-hive, which cannot fail of affording the higheſt entertainment to a curious and inquiſitive mind. It conſiſts of a glaſs receiver, repreſented at D, eighteen inches in height, eight inches in diameter at the bottom, and in the greateſt part thirteen. This receiver has a hole at the top, about an inch in diameter, through which a ſquare piece of deal E is extended nearly to the bottom of the veſſel, having two croſs bars to which the bees faſten their combs. When the bees have filled their ſtraw-hives, (which muſt have a hole in the center, covered with a piece of tin) Mr. Thorley places the glaſs *c* upon the top of the ſtraw-hive, and draws out the piece of tin: the bees, now finding their habitation enlarged, purſue their labours with ſuch alacrity, that they fill this glaſs-hive likewiſe with their ſtores. And as this receptacle is wholly tranſparent, the curious obſerver may entertain himſelf with viewing the whole progreſs of their works. One of the hives, now depoſited at the Society's room in the Strand, is filled with the produce of the labours of thoſe inſects; and the glaſs-hive is ſuppoſed to contain about thirty-eight pounds of honey.

It will, however, be neceſſary to cover the glaſs with an empty hive of ſtraw, or at leaſt with a cloth, which may be eaſily removed when you inſpect your bees, leſt too much light prevent your inſects from working.

When the glaſs is completely filled, ſlide a tin-plate between it and the hive or box, ſo as to cover the paſſage, and in half an hour the glaſs may be taken off with ſafety. What few bees remain in it, will readily go to their companions. He then very obligingly offers his ſervice and farther information to any gentleman or lady whoſe curioſity may incline them to inſpect his apiary. He has added a glaſs window to his ſtraw-hives, in order to ſee what progreſs the bees make; which is of ſome importance, eſpecially if one hive is to be taken away while the ſeaſon ſtill continues favourable for their collecting of honey: for when the combs are filled with honey, the cells are ſealed up, and the bees forſake them, and reſide moſtly in the hive in which their works are chiefly carried on. Obſerving alſo, that the bees were apt to extend their combs through the paſſage of communication into the upper hive, whether glaſs or other, which rendered it neceſſary to divide the comb when the upper hive was taken away, he now puts in that paſſage a wire-ſcreen, or netting, the meſhes of which are large enough for a loaded bee to go eaſily through them; this prevents the joining of the combs from one box to the other, and conſequently obviates the neceſſity of cutting them, and of ſpilling ſome honey, which, running down amongſt a crowd of bees, uſed before to incommode them much; it being difficult for them to clear their wings of it.

The reverend Mr. Stephen White, rector of Holton in Suffolk, informs us, that his fondneſs for theſe little animals ſoon put him upon endeavouring, if poſſible, to ſave them from *fire* and *brimſtone*; that he thought he had reaſon to be content to ſhare their labours for the preſent, and great reaſon to rejoice if he could at any time preſerve their lives, to work for him another year; and that the main drift of his obſervations and experiments has therefore been, to diſcover an eaſy and cheap method, ſuited to the abilities of the common people, of taking away ſo much honey as can be ſpared, without deſtroying or ſtarving the bees, and by the ſame means to encourage ſeaſonable ſwarms.

In his directions how to make the bee-boxes of his inventing, he tells us, ſpeaking of the manner of conſtructing a ſingle one, that it may be made of deal or any other well-ſeaſoned boards which are not apt to warp or ſplit. The boards ſhould be near an inch thick: the figure of the box ſquare, and its heighth and breadth nine inches and five eighths every way, meaſuring within. With theſe dimenſions it will contain near a peck and an half. The front part muſt have a door cut in the middle of the bottom edge, three inches wide, and near half an inch in height, which will give free liberty to the bees to paſs through, yet not be large enough for their enemy the mouſe to enter. In the back part you muſt cut a hole with a rabbet in it, in which you are to fix a pane of the cleareſt and beſt crown-glaſs, about five inches in length, and three in breadth, and faſten it with putty: let the top of the glaſs be placed as high as the roof within-ſide, that you may ſee the upper part of the combs, where the bees with their riches are moſtly placed. You will, by this means, be better able to judge of their ſtate and ſtrength, than if your glaſs was fixed in the middle. The glaſs muſt be covered with a thin piece of board, by way of ſhutter, which may be made to hang by a ſtring, or turn upon a nail, or ſlide ſideways between two mouldings. Such as are deſirous of ſeeing more of the bees works, may make the glaſs as large as the box will admit, without weakening it too much; or they may add a pane of glaſs on the top, which muſt likewiſe be covered with a ſhutter, faſtened down with pegs to prevent accidents.

The ſide of the box, which is to be joined to another box of the ſame form and dimenſions, as it will not be expoſed to the external air, may be made of a piece of ſlit deal not half an inch thick. This he calls the ſide of communication, becauſe it is not to be wholly incloſed: a ſpace is to be left at the bottom, the whole breadth of the box, and a little more than an inch in height, and a hole or paſſage is to be made at top, three inches long, and more than half an inch wide. Through theſe the bees are to have a communication from one box to the other. The lower communication being on the floor, our labourers, with their burthens, may readily and eaſily aſcend into either of the boxes. The upper communication is only intended as a paſſage between the boxes, reſembling the little holes, or narrow paſſes, which may be obſerved in the combs formed by our ſagacious architects, to ſave time and ſhorten the way when they have occaſion to paſs from one comb to another; juſt as, in populous cities, there are narrow lanes and alleys, paſſing tranſverſely from one large ſtreet to another.

In the next place you are to provide a looſe board, half an inch thick, and large enough to cover the ſide where you have made the communication. You are likewiſe to have in readineſs ſeveral little iron ſtaples, an inch and half long, with the two points or ends bended down more than half an inch. The uſe of theſe will be ſeen preſently.

You have now only to fix two ſticks croſſing the box from ſide to ſide, and croſſing each other, to be a ſtay to the combs; one about three inches from the bottom, the other the ſame diſtance from the top; and when you have painted the whole, to make it more durable, your box is finiſhed.

The judicious bee-maſter will here obſerve, that the form of the box now deſcribed is as plain as is poſſible for it to be. It is little more than five ſquare pieces of board nailed together; ſo that a poor cottager, who has but ingenuity enough to ſaw a board into the given dimenſions, and to drive a nail, may make his own boxes well enough, without the help or expence of a carpenter.

No directions are neceſſary for making the other box, which muſt be of the ſame form and dimenſions. The two boxes differ from each other only in this, that the ſide of communication of the one muſt be on your right-hand, of the other on the left. Plate III. fig. 9. repreſents two of theſe boxes, with their openings of communication, ready to join to each other.

Mr. White's manner of hiving a ſwarm into one or more of theſe boxes, is thus:

You are to take the looſe board, and faſten it to one of the boxes, ſo as to ſtop the communications. This may be done by three of the ſtaples before-mentioned; one on the top of the box near the front, the two others on the back, near the top and near the bottom. Let one end of the ſtaple be thruſt into a gimblet-hole made in the box, ſo that the other end may go as tight as can be over the looſe board, to keep it from ſlipping when it is handled. The next morning, after the bees have been hived in this box, the other box ſhould be added, and the looſe board ſhould be taken away. This will prevent a great deal of labour to the bees, and ſome to the proprietor.

Be careful to faſten the ſhutter ſo cloſe to the glaſs, that no light may enter through it: for the bees ſeem to look upon ſuch light as a hole or breach in their houſe, and on that account may not ſo well like their new habitation. But the principal thing to be obſerved at this time, is to cover the box, as ſoon as the bees are hived, with a linen-cloth thrown looſely over it, or with green boughs, to protect it from the piercing heat of the ſun. Boxes will admit the heat much ſooner than ſtraw-hives; and if the bees find their houſe too hot for them, they will be wiſe enough to leave it. If the ſwarm be larger than uſual, inſtead of faſtening the looſe board to one box, you may join two boxes together with three ſtaples, leaving the communication open from one to the other, and then hive your bees into both. In all other reſpects, they are to be hived in boxes after the ſame manner as in common hives; which being well known, it were needleſs here to give particular directions concerning it.

The door of the ſecond box ſhould be carefully ſtopped up, and be kept conſtantly cloſed, in order that the bees may not have any entrance but through the firſt box.

When the boxes are ſet in the places where they are to remain, they muſt be ſcreened from the ſummer's ſun, becauſe the wood will be otherwiſe heated to a greater degree than either the bees or their works can bear; and they ſhould likewiſe be ſcreened from the winter's ſun, becauſe the warmth of this will draw the bees from that lethargic ſtate which is natural to them, as well as to many other inſects, in the winter ſeaſon. For this purpoſe, and alſo to ſhelter the boxes from rain, our ingenious clergymen has contrived the following frame:

Plate III. fig. 10. repreſents the front of a frame for twelve colonies; *a*, *a*, are two cells of oak, lying flat on the ground, more than four feet long. In theſe cells you are to fix four oaken poſts, about the thickneſs of ſuch as are uſed for drying linen.

The two poſts *b*, *b*, in the front, are about ſix feet two inches above the cells; the other two ſtanding backward, five feet eight inches.

You are next to nail ſome boards of ſlit deal horizontally from one of the fore-poſts to the other, to ſcreen the bees from the ſun. Let theſe boards be ſeven feet ſeven inches in length, and nailed to the inſide of the poſts, and be well ſeaſoned, that they may not ſhrink or gape in the joints.

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Plate III. fig. 11. repreſents the back of the frame. *d*, *d*, *d*, *d*, are four ſtrong boards of the ſame length with the frame, on which you are to place the boxes. Let the upper ſide of them be very ſmooth and even, that the boxes may ſtand true upon them; or it may be ſtill more adviſable, to place under every pair of boxes a ſmooth thin board, as long as the boxes, and about a quarter of an inch wider. The bees will ſoon faſten the boxes to this board, in ſuch manner that you may move or weigh the boxes and board together, without breaking the wax or reſin, which for many reaſons ought to be avoided. Theſe floors muſt be ſupported by pieces of wood, or bearers *e*, *e*, &c. which are nailed from poſt to poſt at each end. They are likewiſe to be well nailed to the frame, to keep them from ſinking with the weight of the boxes.

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You have now only to cut niches or holes in the frame, over againſt each mouth or entrance into the boxes, at *b*, *b*, *b*, in fig. 10. Let theſe niches be near four inches long; and under each you muſt nail a ſmall piece of wood for the bees to alight upon.

The morning or evening ſun will ſhine upon one or both ends of the frame, let its aſpect be what it will: but you may prevent its over-heating the boxes, by a looſe board ſet up between the poſts, and kept in by two or three pegs.

The ſame gentleman, with great humanity, obſerves, that no true lover of bees ever lighted the fatal match without concern; and that it is evidently more to our advantage to ſpare the lives of our bees, and be content with part of their ſtores, than to kill and take poſſeſſion of the whole.

About the latter end of Auguſt, ſays he, by a little inſpection through your glaſſes, you may eaſily diſcover which of your colonies you may lay under contribution. Such as have filled a box and a half with their works, will pretty readily yield you the half box. But you are not to depend upon the quantity of combs, without examining how they are ſtored with honey. The bees ſhould, according to him, have eight or nine pounds left them, by way of wages for their ſummer's work.

The moſt proper time for this buſineſs is the middle of the day: and as you ſtand behind the frame, you will need no armour, except a pair of gloves. The operation itſelf is very ſimple, and eaſily performed, thus: open the mouth of the box you intend to take; then with a thin knife, cut through the reſin with which the bees have joined the boxes to each other, till you find that you have ſeparated them; and after this thruſt a ſheet of tin gently in between the boxes. The communication being thereby ſtopped, the bees in the fulleſt box, where moſt likely the queen is, will be a little diſturbed at the operation; but thoſe in the other box, where we ſuppoſe the queen is not, will run to and fro in the utmoſt hurry and confuſion, and ſend forth a mournful cry, eaſily diſtinguiſhed from their other notes. They will iſſue out at the newly opened door; not in a body, as when they ſwarm, nor with ſuch calm and cheerful activity as when they go forth to their labours; but by one or two at a time, with a wild flutter, and viſible rage and diſorder. This, however, is ſoon over; for as ſoon as they get abroad, and ſpy their fellows, they fly to them inſtantly, and join them at the mouth of the other box. By this means, in an hour or two, for they go out ſlowly, you will have a box of pure honey, without a living bee in it to moleſt you; and likewiſe without dead bees, which, when you harm them, are often mixed with your honey, and both waſte and damage it.

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The indefatigable Mr. Wildman has obliged the world with the following method of taking the wax and honey, without deſtroying the bees:

Remove, ſays he, the hive from which you would take the wax and honey, into a room; into which admit but little light, that it may at firſt appear to the bees as if it were late in the evening. Gently invert the hive, placing it between the frames of a chair, or other ſteady ſupport, and cover it with an empty hive, keeping the ſide next the window of the empty hive raiſed a little, to give the bees ſufficient light to get into it. While you hold the empty hive ſteadily ſupported on the edge of the full hive, between your ſide and your left arm, keep ſtriking with your other hand all round the full hive from top to bottom, in the manner of beating a drum, ſo that the bees may be frightened by the continual noiſe from all quarters; and they will, in conſequence, mount out of the full hive into

the center of the box, and are faſtened to the pannels by means of ſmall ſcrews. To theſe ſlips the bees faſten their combs.

In this octangular box the bees are hived, after ſwarming in the uſual manner, and there ſuffered to continue till they have built their combs, and filled them with honey, which may be known from opening the door, and viewing their works through the glaſs-pane, or by the weight of the hive. When the bee-maſter finds his laborious inſects have filled their habitation, he is to place a common bee-hive of ſtraw, repreſented at *b*, made either flat at the top, or in the common form, on the octangular box, and draw out the ſlider, by which a communication will be opened between the box and the bee-hive; the conſequence of which will be, that thoſe laborious inſects will fill this hive alſo with the product of their labours. When the bee-maſter finds the ſtraw-hive is well filled, he may puſh in the ſlider, and take it away, placing another immediately in its room, and then drawing out the ſlider. Theſe indefatigible creatures will then fill the new hive in the ſame manner. By proceeding in this method, Mr. Thorley aſſured the Society that he had taken three ſucceſſive hives, filled with honey and wax, from one ſingle hive, during the ſame ſummer; and that after he had laid his inſects under ſo large a contribution, the food ſtill remaining in the octangular box was abundantly ſufficient for their ſupport during the winter. He added, that if this method was purſued in every part of the kingdom, inſtead of that cruel method of putting the creatures to death, he was perſuaded, from long experience, that wax would be collected in ſuch plenty that candles might be made with it, and ſold as cheap as thoſe of tallow are at preſent.

Mr. Thorley has alſo added another part to his bee-hive, which cannot fail of affording the higheſt entertainment to a curious and inquiſitive mind. It conſiſts of a glaſs receiver, repreſented at D, eighteen inches in height, eight inches in diameter at the bottom, and in the greateſt part thirteen. This receiver has a hole at the top, about an inch in diameter, through which a ſquare piece of deal E is extended nearly to the bottom of the veſſel, having two croſs bars to which the bees faſten their combs. When the bees have filled their ſtraw-hives, (which muſt have a hole in the center, covered with a piece of tin) Mr. Thorley places the glaſs *c* upon the top of the ſtraw-hive, and draws out the piece of tin: the bees, now finding their habitation enlarged, purſue their labours with ſuch alacrity, that they fill this glaſs-hive likewiſe with their ſtores. And as this receptacle is wholly tranſparent, the curious obſerver may entertain himſelf with viewing the whole progreſs of their works. One of the hives, now depoſited at the Society's room in the Strand, is filled with the produce of the labours of thoſe inſects; and the glaſs-hive is ſuppoſed to contain about thirty-eight pounds of honey.

It will, however, be neceſſary to cover the glaſs with an empty hive of ſtraw, or at leaſt with a cloth, which may be eaſily removed when you inſpect your bees, leſt too much light prevent your inſects from working.

When the glaſs is completely filled, ſlide a tin-plate between it and the hive or box, ſo as to cover the paſſage, and in half an hour the glaſs may be taken off with ſafety. What few bees remain in it, will readily go to their companions. He then very obligingly offers his ſervice and farther information to any gentleman or lady whoſe curioſity may incline them to inſpect his apiary. He has added a glaſs window to his ſtraw-hives, in order to ſee what progreſs the bees make; which is of ſome importance, eſpecially if one hive is to be taken away while the ſeaſon ſtill continues favourable for their collecting of honey: for when the combs are filled with honey, the cells are ſealed up, and the bees forſake them, and reſide moſtly in the hive in which their works are chiefly carried on. Obſerving alſo, that the bees were apt to extend their combs through the paſſage of communication into the upper hive, whether glaſs or other, which rendered it neceſſary to divide the comb when the upper hive was taken away, he now puts in that paſſage a wire-ſcreen, or netting, the meſhes of which are large enough for a loaded bee to go eaſily through them; this prevents the joining of the combs from one box to the other, and conſequently obviates the neceſſity of cutting them, and of ſpilling ſome honey, which, running down amongſt a crowd of bees, uſed before to incommode them much; it being difficult for them to clear their wings of it.

The reverend Mr. Stephen White, rector of Holton in Suffolk, informs us, that his fondneſs for theſe little animals ſoon put him upon endeavouring, if poſſible, to ſave them from *fire* and *brimſtone*; that he thought he had reaſon to be content to ſhare their labours for the preſent, and great reaſon to rejoice if he could at any time preſerve their lives, to work for him another year; and that the main drift of his obſervations and experiments has therefore been, to diſcover an eaſy and cheap method, ſuited to the abilities of the common people, of taking away ſo much honey as can be ſpared, without deſtroying or ſtarving the bees, and by the ſame means to encourage ſeaſonable ſwarms.

In his directions how to make the bee-boxes of his inventing, he tells us, ſpeaking of the manner of conſtructing a ſingle one, that it may be made of deal or any other well-ſeaſoned boards which are not apt to warp or ſplit. The boards ſhould be near an inch thick: the figure of the box ſquare, and its heighth and breadth nine inches and five eighths every way, meaſuring within. With theſe dimenſions it will contain near a peck and an half. The front part muſt have a door cut in the middle of the bottom edge, three inches wide, and near half an inch in height, which will give free liberty to the bees to paſs through, yet not be large enough for their enemy the mouſe to enter. In the back part you muſt cut a hole with a rabbet in it, in which you are to fix a pane of the cleareſt and beſt crown-glaſs, about five inches in length, and three in breadth, and faſten it with putty: let the top of the glaſs be placed as high as the roof within-ſide, that you may ſee the upper part of the combs, where the bees with their riches are moſtly placed. You will, by this means, be better able to judge of their ſtate and ſtrength, than if your glaſs was fixed in the middle. The glaſs muſt be covered with a thin piece of board, by way of ſhutter, which may be made to hang by a ſtring, or turn upon a nail, or ſlide ſideways between two mouldings. Such as are deſirous of ſeeing more of the bees works, may make the glaſs as large as the box will admit, without weakening it too much; or they may add a pane of glaſs on the top, which muſt likewiſe be covered with a ſhutter, faſtened down with pegs to prevent accidents.

The ſide of the box, which is to be joined to another box of the ſame form and dimenſions, as it will not be expoſed to the external air, may be made of a piece of ſlit deal not half an inch thick. This he calls the ſide of communication, becauſe it is not to be wholly incloſed: a ſpace is to be left at the bottom, the whole breadth of the box, and a little more than an inch in height, and a hole or paſſage is to be made at top, three inches long, and more than half an inch wide. Through theſe the bees are to have a communication from one box to the other. The lower communication being on the floor, our labourers, with their burthens, may readily and eaſily aſcend into either of the boxes. The upper communication is only intended as a paſſage between the boxes, reſembling the little holes, or narrow paſſes, which may be obſerved in the combs formed by our ſagacious architects, to ſave time and ſhorten the way when they have occaſion to paſs from one comb to another; juſt as, in populous cities, there are narrow lanes and alleys, paſſing tranſverſely from one large ſtreet to another.

In the next place you are to provide a looſe board, half an inch thick, and large enough to cover the ſide where you have made the communication. You are likewiſe to have in readineſs ſeveral little iron ſtaples, an inch and half long, with the two points or ends bended down more than half an inch. The uſe of theſe will be ſeen preſently.

You have now only to fix two ſticks croſſing the box from ſide to ſide, and croſſing each other, to be a ſtay to the combs; one about three inches from the bottom, the other the ſame diſtance from the top; and when you have painted the whole, to make it more durable, your box is finiſhed.

The judicious bee-maſter will here obſerve, that the form of the box now deſcribed is as plain as is poſſible for it to be. It is little more than five ſquare pieces of board nailed together; ſo that a poor cottager, who has but ingenuity enough to ſaw a board into the given dimenſions, and to drive a nail, may make his own boxes well enough, without the help or expence of a carpenter.

No directions are neceſſary for making the other box, which muſt be of the ſame form and dimenſions. The two boxes differ from each other only in this, that the ſide of communication of the one muſt be on your right-hand, of the other on the left. Plate III. fig. 9. repreſents two of theſe boxes, with their openings of communication, ready to join to each other.

Mr. White's manner of hiving a ſwarm into one or more of theſe boxes, is thus:

You are to take the looſe board, and faſten it to one of the boxes, ſo as to ſtop the communications. This may be done by three of the ſtaples before-mentioned; one on the top of the box near the front, the two others on the back, near the top and near the bottom. Let one end of the ſtaple be thruſt into a gimblet-hole made in the box, ſo that the other end may go as tight as can be over the looſe board, to keep it from ſlipping when it is handled. The next morning, after the bees have been hived in this box, the other box ſhould be added, and the looſe board ſhould be taken away. This will prevent a great deal of labour to the bees, and ſome to the proprietor.

Be careful to faſten the ſhutter ſo cloſe to the glaſs, that no light may enter through it: for the bees ſeem to look upon ſuch light as a hole or breach in their houſe, and on that account may not ſo well like their new habitation. But the principal thing to be obſerved at this time, is to cover the box, as ſoon as the bees are hived, with a linen-cloth thrown looſely over it, or with green boughs, to protect it from the piercing heat of the ſun. Boxes will admit the heat much ſooner than ſtraw-hives; and if the bees find their houſe too hot for them, they will be wiſe enough to leave it. If the ſwarm be larger than uſual, inſtead of faſtening the looſe board to one box, you may join two boxes together with three ſtaples, leaving the communication open from one to the other, and then hive your bees into both. In all other reſpects, they are to be hived in boxes after the ſame manner as in common hives; which being well known, it were needleſs here to give particular directions concerning it.

The door of the ſecond box ſhould be carefully ſtopped up, and be kept conſtantly cloſed, in order that the bees may not have any entrance but through the firſt box.

When the boxes are ſet in the places where they are to remain, they muſt be ſcreened from the ſummer's ſun, becauſe the wood will be otherwiſe heated to a greater degree than either the bees or their works can bear; and they ſhould likewiſe be ſcreened from the winter's ſun, becauſe the warmth of this will draw the bees from that lethargic ſtate which is natural to them, as well as to many other inſects, in the winter ſeaſon. For this purpoſe, and alſo to ſhelter the boxes from rain, our ingenious clergymen has contrived the following frame:

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Remove, ſays he, the hive from which you would take the wax and honey, into a room; into which admit but little light, that it may at firſt appear to the bees as if it were late in the evening. Gently invert the hive, placing it between the frames of a chair, or other ſteady ſupport, and cover it with an empty hive, keeping the ſide next the window of the empty hive raiſed a little, to give the bees ſufficient light to get into it. While you hold the empty hive ſteadily ſupported on the edge of the full hive, between your ſide and your left arm, keep ſtriking with your other hand all round the full hive from top to bottom, in the manner of beating a drum, ſo that the bees may be frightened by the continual noiſe from all quarters; and they will, in conſequence, mount out of the full hive into the empty

the center of the box, and are faſtened to the pannels by means of ſmall ſcrews. To theſe ſlips the bees faſten their combs.

In this octangular box the bees are hived, after ſwarming in the uſual manner, and there ſuffered to continue till they have built their combs, and filled them with honey, which may be known from opening the door, and viewing their works through the glaſs-pane, or by the weight of the hive. When the bee-maſter finds his laborious inſects have filled their habitation, he is to place a common bee-hive of ſtraw, repreſented at *b*, made either flat at the top, or in the common form, on the octangular box, and draw out the ſlider, by which a communication will be opened between the box and the bee-hive; the conſequence of which will be, that thoſe laborious inſects will fill this hive alſo with the product of their labours. When the bee-maſter finds the ſtraw-hive is well filled, he may puſh in the ſlider, and take it away, placing another immediately in its room, and then drawing out the ſlider. Theſe indefatigible creatures will then fill the new hive in the ſame manner. By proceeding in this method, Mr. Thorley aſſured the Society that he had taken three ſucceſſive hives, filled with honey and wax, from one ſingle hive, during the ſame ſummer; and that after he had laid his inſects under ſo large a contribution, the food ſtill remaining in the octangular box was abundantly ſufficient for their ſupport during the winter. He added, that if this method was purſued in every part of the kingdom, inſtead of that cruel method of putting the creatures to death, he was perſuaded, from long experience, that wax would be collected in ſuch plenty that candles might be made with it, and ſold as cheap as thoſe of tallow are at preſent.

Mr. Thorley has alſo added another part to his bee-hive, which cannot fail of affording the higheſt entertainment to a curious and inquiſitive mind. It conſiſts of a glaſs receiver, repreſented at D, eighteen inches in height, eight inches in diameter at the bottom, and in the greateſt part thirteen. This receiver has a hole at the top, about an inch in diameter, through which a ſquare piece of deal E is extended nearly to the bottom of the veſſel, having two croſs bars to which the bees faſten their combs. When the bees have filled their ſtraw-hives, (which muſt have a hole in the center, covered with a piece of tin) Mr. Thorley places the glaſs *c* upon the top of the ſtraw-hive, and draws out the piece of tin: the bees, now finding their habitation enlarged, purſue their labours with ſuch alacrity, that they fill this glaſs-hive likewiſe with their ſtores. And as this receptacle is wholly tranſparent, the curious obſerver may entertain himſelf with viewing the whole progreſs of their works. One of the hives, now depoſited at the Society's room in the Strand, is filled with the produce of the labours of thoſe inſects; and the glaſs-hive is ſuppoſed to contain about thirty-eight pounds of honey.

It will, however, be neceſſary to cover the glaſs with an empty hive of ſtraw, or at leaſt with a cloth, which may be eaſily removed when you inſpect your bees, leſt too much light prevent your inſects from working.

When the glaſs is completely filled, ſlide a tin-plate between it and the hive or box, ſo as to cover the paſſage, and in half an hour the glaſs may be taken off with ſafety. What few bees remain in it, will readily go to their companions. He then very obligingly offers his ſervice and farther information to any gentleman or lady whoſe curioſity may incline them to inſpect his apiary. He has added a glaſs window to his ſtraw-hives, in order to ſee what progreſs the bees make; which is of ſome importance, eſpecially if one hive is to be taken away while the ſeaſon ſtill continues favourable for their collecting of honey: for when the combs are filled with honey, the cells are ſealed up, and the bees forſake them, and reſide moſtly in the hive in which their works are chiefly carried on. Obſerving alſo, that the bees were apt to extend their combs through the paſſage of communication into the upper hive, whether glaſs or other, which rendered it neceſſary to divide the comb when the upper hive was taken away, he now puts in that paſſage a wire-ſcreen, or netting, the meſhes of which are large enough for a loaded bee to go eaſily through them; this prevents the joining of the combs from one box to the other, and conſequently obviates the neceſſity of cutting them, and of ſpilling ſome honey, which, running down amongſt a crowd of bees, uſed before to incommode them much; it being difficult for them to clear their wings of it.

The reverend Mr. Stephen White, rector of Holton in Suffolk, informs us, that his fondneſs for theſe little animals ſoon put him upon endeavouring, if poſſible, to ſave them from *fire* and *brimſtone*; that he thought he had reaſon to be content to ſhare their labours for the preſent, and great reaſon to rejoice if he could at any time preſerve their lives, to work for him another year; and that the main drift of his obſervations and experiments has therefore been, to diſcover an eaſy and cheap method, ſuited to the abilities of the common people, of taking away ſo much honey as can be ſpared, without deſtroying or ſtarving the bees, and by the ſame means to encourage ſeaſonable ſwarms.

In his directions how to make the bee-boxes of his inventing, he tells us, ſpeaking of the manner of conſtructing a ſingle one, that it may be made of deal or any other well-ſeaſoned boards which are not apt to warp or ſplit. The boards ſhould be near an inch thick: the figure of the box ſquare, and its heighth and breadth nine inches and five eighths every way, meaſuring within. With theſe dimenſions it will contain near a peck and an half. The front part muſt have a door cut in the middle of the bottom edge, three inches wide, and near half an inch in height, which will give free liberty to the bees to paſs through, yet not be large enough for their enemy the mouſe to enter. In the back part you muſt cut a hole with a rabbet in it, in which you are to fix a pane of the cleareſt and beſt crown-glaſs, about five inches in length, and three in breadth, and faſten it with putty: let the top of the glaſs be placed as high as the roof within-ſide, that you may ſee the upper part of the combs, where the bees with their riches are moſtly placed. You will, by this means, be better able to judge of their ſtate and ſtrength, than if your glaſs was fixed in the middle. The glaſs muſt be covered with a thin piece of board, by way of ſhutter, which may be made to hang by a ſtring, or turn upon a nail, or ſlide ſideways between two mouldings. Such as are deſirous of ſeeing more of the bees works, may make the glaſs as large as the box will admit, without weakening it too much; or they may add a pane of glaſs on the top, which muſt likewiſe be covered with a ſhutter, faſtened down with pegs to prevent accidents.

The ſide of the box, which is to be joined to another box of the ſame form and dimenſions, as it will not be expoſed to the external air, may be made of a piece of ſlit deal not half an inch thick. This he calls the ſide of communication, becauſe it is not to be wholly incloſed: a ſpace is to be left at the bottom, the whole breadth of the box, and a little more than an inch in height, and a hole or paſſage is to be made at top, three inches long, and more than half an inch wide. Through theſe the bees are to have a communication from one box to the other. The lower communication being on the floor, our labourers, with their burthens, may readily and eaſily aſcend into either of the boxes. The upper communication is only intended as a paſſage between the boxes, reſembling the little holes, or narrow paſſes, which may be obſerved in the combs formed by our ſagacious architects, to ſave time and ſhorten the way when they have occaſion to paſs from one comb to another; juſt as, in populous cities, there are narrow lanes and alleys, paſſing tranſverſely from one large ſtreet to another.

In the next place you are to provide a looſe board, half an inch thick, and large enough to cover the ſide where you have made the communication. You are likewiſe to have in readineſs ſeveral little iron ſtaples, an inch and half long, with the two points or ends bended down more than half an inch. The uſe of theſe will be ſeen preſently.

You have now only to fix two ſticks croſſing the box from ſide to ſide, and croſſing each other, to be a ſtay to the combs; one about three inches from the bottom, the other the ſame diſtance from the top; and when you have painted the whole, to make it more durable, your box is finiſhed.

The judicious bee-maſter will here obſerve, that the form of the box now deſcribed is as plain as is poſſible for it to be. It is little more than five ſquare pieces of board nailed together; ſo that a poor cottager, who has but ingenuity enough to ſaw a board into the given dimenſions, and to drive a nail, may make his own boxes well enough, without the help or expence of a carpenter.

No directions are neceſſary for making the other box, which muſt be of the ſame form and dimenſions. The two boxes differ from each other only in this, that the ſide of communication of the one muſt be on your right-hand, of the other on the left. Plate III. fig. 9. repreſents two of theſe boxes, with their openings of communication, ready to join to each other.

Mr. White's manner of hiving a ſwarm into one or more of theſe boxes, is thus:

You are to take the looſe board, and faſten it to one of the boxes, ſo as to ſtop the communications. This may be done by three of the ſtaples before-mentioned; one on the top of the box near the front, the two others on the back, near the top and near the bottom. Let one end of the ſtaple be thruſt into a gimblet-hole made in the box, ſo that the other end may go as tight as can be over the looſe board, to keep it from ſlipping when it is handled. The next morning, after the bees have been hived in this box, the other box ſhould be added, and the looſe board ſhould be taken away. This will prevent a great deal of labour to the bees, and ſome to the proprietor.

Be careful to faſten the ſhutter ſo cloſe to the glaſs, that no light may enter through it: for the bees ſeem to look upon ſuch light as a hole or breach in their houſe, and on that account may not ſo well like their new habitation. But the principal thing to be obſerved at this time, is to cover the box, as ſoon as the bees are hived, with a linen-cloth thrown looſely over it, or with green boughs, to protect it from the piercing heat of the ſun. Boxes will admit the heat much ſooner than ſtraw-hives; and if the bees find their houſe too hot for them, they will be wiſe enough to leave it. If the ſwarm be larger than uſual, inſtead of faſtening the looſe board to one box, you may join two boxes together with three ſtaples, leaving the communication open from one to the other, and then hive your bees into both. In all other reſpects, they are to be hived in boxes after the ſame manner as in common hives; which being well known, it were needleſs here to give particular directions concerning it.

The door of the ſecond box ſhould be carefully ſtopped up, and be kept conſtantly cloſed, in order that the bees may not have any entrance but through the firſt box.

When the boxes are ſet in the places where they are to remain, they muſt be ſcreened from the ſummer's ſun, becauſe the wood will be otherwiſe heated to a greater degree than either the bees or their works can bear; and they ſhould likewiſe be ſcreened from the winter's ſun, becauſe the warmth of this will draw the bees from that lethargic ſtate which is natural to them, as well as to many other inſects, in the winter ſeaſon. For this purpoſe, and alſo to ſhelter the boxes from rain, our ingenious clergymen has contrived the following frame:

Plate III. fig. 10. repreſents the front of a frame for twelve colonies; *a*, *a*, are two cells of oak, lying flat on the ground, more than four feet long. In theſe cells you are to fix four oaken poſts, about the thickneſs of ſuch as are uſed for drying linen.

The two poſts *b*, *b*, in the front, are about ſix feet two inches above the cells; the other two ſtanding backward, five feet eight inches.

You are next to nail ſome boards of ſlit deal horizontally from one of the fore-poſts to the other, to ſcreen the bees from the ſun. Let theſe boards be ſeven feet ſeven inches in length, and nailed to the inſide of the poſts, and be well ſeaſoned, that they may not ſhrink or gape in the joints.

c, *c*, are two ſplines of deal, to keep the boards even, and ſtrengthen them.

Plate III. fig. 11. repreſents the back of the frame. *d*, *d*, *d*, *d*, are four ſtrong boards of the ſame length with the frame, on which you are to place the boxes. Let the upper ſide of them be very ſmooth and even, that the boxes may ſtand true upon them; or it may be ſtill more adviſable, to place under every pair of boxes a ſmooth thin board, as long as the boxes, and about a quarter of an inch wider. The bees will ſoon faſten the boxes to this board, in ſuch manner that you may move or weigh the boxes and board together, without breaking the wax or reſin, which for many reaſons ought to be avoided. Theſe floors muſt be ſupported by pieces of wood, or bearers *e*, *e*, &c. which are nailed from poſt to poſt at each end. They are likewiſe to be well nailed to the frame, to keep them from ſinking with the weight of the boxes.

f repreſents the roof, which projects backward about ſeven or eight inches beyond the boxes, to ſhelter them from rain.

You have now only to cut niches or holes in the frame, over againſt each mouth or entrance into the boxes, at *h*, *h*, *h*, in fig. 10. Let theſe niches be near four inches long; and under each you muſt nail a ſmall piece of wood for the bees to alight upon.

The morning or evening ſun will ſhine upon one or both ends of the frame, let its aſpect be what it will: but you may prevent its over-heating the boxes, by a looſe board ſet up between the poſts, and kept in by two or three pegs.

The ſame gentleman, with great humanity, obſerves, that no true lover of bees ever lighted the fatal match without concern; and that it is evidently more to our advantage to ſpare the lives of our bees, and be content with part of their ſtores, than to kill and take poſſeſſion of the whole.

About the latter end of Auguſt, ſays he, by a little inſpection through your glaſſes, you may eaſily diſcover which of your colonies you may lay under contribution. Such as have filled a box and a half with their works, will pretty readily yield you the half box. But you are not to depend upon the quantity of combs, without examining how they are ſtored with honey. The bees ſhould, according to him, have eight or nine pounds left them, by way of wages for their ſummer's work.

The moſt proper time for this buſineſs is the middle of the day: and as you ſtand behind the frame, you will need no armour, except a pair of gloves. The operation itſelf is very ſimple, and eaſily performed, thus: open the mouth of the box you intend to take; then with a thin knife, cut through the reſin with which the bees have joined the boxes to each other, till you find that you have ſeparated them; and after this thruſt a ſheet of tin gently in between the boxes. The communication being thereby ſtopped, the bees in the fulleſt box, where moſt likely the queen is, will be a little diſturbed at the operation; but thoſe in the other box, where we ſuppoſe the queen is not, will run to and fro in the utmoſt hurry and confuſion, and ſend forth a mournful cry, eaſily diſtinguiſhed from their other notes. They will iſſue out at the newly opened door; not in a body, as when they ſwarm, nor with ſuch calm and cheerful activity as when they go forth to their labours; but by one or two at a time, with a wild flutter, and viſible rage and diſorder. This, however, is ſoon over; for as ſoon as they get abroad, and ſpy their fellows, they fly to them inſtantly, and join them at the mouth of the other box. By this means, in an hour or two, for they go out ſlowly, you will have a box of pure honey, without a living bee in it to moleſt you; and likewiſe without dead bees, which, when you harm them, are often mixed with your honey, and both waſte and damage it.

Mr. White's boxes are very convenient, not only for taking away part of the honey, without breaking the combs, without killing any of the bees, or much diſturbing them, but alſo on two other accounts: firſt, for feeding weak ſwarms, or ſuch whoſe ſtock of proviſion is exhauſted, and require to be fed to keep them alive; the uſual methods of feeding them with ſugar and other ſubſtances being often ineffectual: and even honey is in ſome degree ſo alſo, for ſeveral reaſons, but principally becauſe the natural food of bees is not honey alone; and whether bee-bread, or whatever elſe, is their food, they have it ready prepared for them, by adding a box to their ſtore that was taken from them, or ſome of the colonies, in autumn; for ſome of theſe boxes, full of combs, ſhould be kept entire, and given them when their own ſtore is exhauſted. A colony of theſe boxes is alſo very conveniently, and with little trouble, cleared of moths, or other inſects, that are pernicious or troubleſome to the bees; for the boxes may be taken away from the colony ſingly; and after the moths, &c. are deſtroyed, may be immediately returned to the colony.

The indefatigable Mr. Wildman has obliged the world with the following method of taking the wax and honey, without deſtroying the bees:

Remove, ſays he, the hive from which you would take the wax and honey, into a room; into which admit but little light, that it may at firſt appear to the bees as if it were late in the evening. Gently invert the hive, placing it between the frames of a chair, or other ſteady ſupport, and cover it with an empty hive, keeping the ſide next the window of the empty hive raiſed a little, to give the bees ſufficient light to get into it. While you hold the empty hive ſteadily ſupported on the edge of the full hive, between your ſide and your left arm, keep ſtriking with your other hand all round the full hive from top to bottom, in the manner of beating a drum, ſo that the bees may be frightened by the continual noiſe from all quarters; and they will, in conſequence, mount out of the full hive into the